

vision in motion

vision in motion

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BOOK

INSTITUTE OF DESIGN

to Elizabeth and Walter Paepcke

L. Moholy-Nagy

vision in motion

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foreword

This book is written for the artist and the layman, for everyone interested in his relationship to our existing civilization. It is an extension of my previous book, "The New Vision". But while "The New Vision" gave mainly particulars about the educational methods of the old Bauhaus, "Vision in Motion" concentrates on the work of the Institute of Design, Chicago, and presents a broader, more general view of the interrelatedness of art and life. Recognizing the arts as an integral part of our existence, this book takes as its basic premise the unity of the arts with life. Thus this book is an attempt to add to the politico-social a *biological "bill of rights"* asserting the interrelatedness of man's fundamental qualities, of his intellectual and emotional requirements, of his psychological well-being and his physical health. It proposes that new tools and technologies cause social changes; that they shift ways of production, possessions, wealth, and power; yet though the inevitable logic of new technologies, offering easy advantages for labor saving and profit making, is willingly accepted on pragmatic intellectual terms, it is stubbornly opposed in the emotional sphere, where man clings to obsolete standards and empty conventions of the past, unapproachable by logical argument and often against his best interests.

This emotional prejudice—or inertia—is the great hindrance to necessary adjustments and social reforms. The remedy is to add to our intellectual literacy an emotional literacy, an education of the senses, the ability to articulate feeling through the means of expression. Without the balanced performance of intellect and feeling,

man becomes crippled, one-sided. Only the combination fosters growth and leads to an assurance of judgment, security of existence. The goal is to make available to everyone the ways of expression which culminate in the arts. Self-expression, which on the highest level becomes art, forms the opening wedge to that otherwise unreachable realm, the subconscious "feelings". Trained and articulated in this way, the emotional forces will be sublimated.

The contemporary arts try to establish a new morality and a new ethics not hampered by metaphysical absolutes. Within this large scheme the work of the Institute of Design, Chicago, stands as a laboratory of the new trends. And though its investigations have been centered around the training of the industrial designer, my hope is that the principles and the scope of its program, as they are outlined in this volume and as they will be reported on also in future "i.d." books, will become an incentive to our whole general education, from the kindergarten to the university.

As to the illustrations, the logical source was the work of the teachers and students of the Institute and my own experiments. • Beyond this, the paintings of the abstract artists in this country are emphasized. Their achievements are a fine testimony to the common platform of creative people all over the world, clarifying the fundamentals of the visual and other means of expression. Unfortunately, many valuable examples had to be omitted because the number of illustrations and the size of this volume are already beyond the original limit set.

Through the publisher's generosity, I was able to make some progress toward a new book form on which I have been experimenting for twenty-five years. I have always held that—for a better visual communication—text and illustration should be welded together. Illustrations should *accompany* the copy and not be searched for. In this book I use a layout which seems better adapted to the present printing technique of machine typesetting and letterpress than the conventional book form of previous periods. Here, all the illustrations are placed where mentioned in the text, either small-sized on the large margin, or larger-sized within the main text or on the opposite page. The result is (at least this was intended) a functional fluidity and greater legibility, that is, a better communication. In the first chapter, where no pictures have been used, the illustrations become verbal, in the form of quotations or remarks. These are set in italics in order to separate them from the captions and text.

This book is integrated in its text and illustrations, but it also considers the impatient reader, who, at first unwilling to plow through the written arguments, may enjoy the pictorial material. Stirred by this, he may then proceed to read brief captions, glossaries, and footnotes until his appetite is whetted to explore the main text.

• *The illustrations of the students' work are marked with a thin ○, those of the faculty with a thicker circle ○*

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L. Moholy-Nagy Chicago, 1946

introduction

To state the case is almost too simple:

The industrial revolution opened up a new dimension—the dimension of a new science and a new technology which could be used for the realization of all-embracing relationships. Contemporary man threw himself into the experience of these new relationships. But saturated with old ideologies, he approached the new dimension with obsolete practices and failed to translate his newly gained experience into emotional language and cultural reality. The result has been and still is misery and conflict, brutality and anguish, unemployment and war.

Emotionally most people live within the old dimensions of anachronistic fixations, tribal prejudices. They are immune against any suggestion for a better use of their resources because in our verbalistic society all such arguments can be answered by counterarguments for the preservation of the status quo. What is needed is a rediscovery of the elements of existence, work, recreation, and a fearless demonstration of their fundamentals relative to our time without paralogy. We have to free the elements of existence from historic accretions, from the turgid symbolism of past association, so that their function and effectiveness will be unimpaired.

Theoretically, man is the sum total of his psychophysical, intellectual, and emotional potentialities. His reasoning power parallels the emotional forces. What he knows, he could also feel if he would train himself in both spheres. In fact, this is his historic struggle, to arrive at an integrated life in which he would function to the fullest of his capacities through a synthesis of the intellectual and the emotional,

through the coordination of penetrative thinking and profound feeling. To reach this goal—to feel what we know and know what we feel—is one of the tasks of our generation.

To achieve this integrated state there is need for a well-balanced social organization and an appropriate education; an education for personal growth and not a mere training in skills for the purpose of profit; a social organization in which everyone is utilized to his highest capacity.

In the training of the human intellect there is an official standard, comprising logical thought categories, the set mechanism of syllogism and rhetoric. But there is also a need for correlated perceptive and emotional education. This is not even yet acknowledged. At present the nonintellectual development of the individual is entirely his private affair, confined to a hit-or-miss approach. The consequence is emotional illiteracy, which means to be without compass, without assurance of feeling, in a complex, immensely extended world.

Generally, the mechanism of feeling is set in motion by a network of sensations both from within and without. The mechanics of inner stimuli is as yet unexplored, although psychoanalysis attempted revolutionary explanations about the subconscious, its traumas, repressions, regressions, and wish-fulfilments. If not sublimated or released, such psychic maelstroms become the foci of conflicts.

More is known about emotional activation from without, starting with simple sensory experiences, which serve as basic material for the externalization—that is the expression—of emotional life. Expression on a high level produces art which is the most effective agent for emotional articulation. It is a sociopsychologically dangerous mistake to allow art to be classified as remote—a luxury—a nonessential.

One of the functions of the artist in society is to put layer upon layer, stone upon stone, in the organization of emotions; to record feelings with his particular means, to give structure and refinement as well as direction to the inner life of his contemporaries. It is the artist's duty today to penetrate yet-unseen ranges of the biological functions, to search the new dimensions of the industrial society and to translate the new findings into emotional orientation. The artist unconsciously disentangles the most essential strands of existence from the contorted and chaotic complexities of actuality, and weaves them into an emotional fabric of compelling validity, characteristic of himself as well as of his epoch. This ability of selection is an outstanding gift based upon intuitive power and insight, upon judgment and knowledge, and upon inner responsibility to fundamental biological and social laws which provoke a reinterpretation in every civilization. This intuitive power is present in other creative workers, too, in philosophers, poets, scientists, technologists. They pursue the same hopes, seek the same meanings, and—although the content of their work appears to be different—the trends of their approach and the background of their activity are identical. They all must draw from the same source, which is life in a certain society, in a certain civilization. This basic identity is the common denominator, the desire

today to find and investigate the fundamentals in every field so that they can become constructive parts of a new civilization.

The problem of our generation is to bring the intellectual and emotional, the social and technological components into balanced play; to learn to see and feel them in relationship.

Without this interrelatedness there remains only the disjunctive technical skill of handling human affairs, a rigidity stifling biological and social impulses; a memorized, not a lived life. •

vision in motion

vision in motion

is simultaneous grasp. Simultaneous grasp is creative performance—seeing, feeling and thinking in relationship and not as a series of isolated phenomena. It instantaneously integrates and transmutes single elements into a coherent whole. This is valid for physical vision as well as for the abstract.

vision in motion

is a synonym for simultaneity and space-time; a means to comprehend the new dimension.

vision in motion

is seeing while moving.

vision in motion

is seeing moving objects either in reality or in forms of visual representation as in cubism and futurism. In the latter case the spectator, stimulated by the specific means of rendering, recreates mentally and emotionally the original motion.

vision in motion

also signifies planning, the projective dynamics of our visionary faculties.

• "The head is not more native to the heart." (Hamlet)

I

analyzing the situation

the discrepancy

Since the industrial revolution our civilization has suffered from a growing discrepancy between ideological potentiality and actual realization.

The metamorphosis of the world through mass production, mass distribution, and mass communication forced man to think in economic terms and organize his business affairs on a global scale. But his life philosophy remained provincial. He absorbed the technological and economic aspects of the industrial revolution with surprising speed but without an understanding of their manifold implications, never realizing their dangerous antibiological and asocial dynamics if accepted without planning. The new technological trends developed rapidly but their social effects soon got out of control. In spite of exultant forecasts, the prodigious potentialities for healthy living, the fair participation in the benefits of mass produced goods, the persistent hopes to generate harmonious social relationships, have as yet not been fulfilled.

Man has invented pseudofundamentals to camouflage the ancient ailment of economic inequality and squalor. Only very slowly if at all, have the manifold advantages of the amazing technical improvements seeped down to the bottom of the economic pyramid. (The last census revealed a staggering percentage of American homes without plumbing, electricity, cooking gas, or adequate heating installations.)

The great metamorphosis served mainly for the accumulation of individual profits; for a sharp increase in the destructiveness of competition decided by force; by a

Concerning the idea of "competition" and "natural selection" Julian Huxley states (in "Evolution: The Modern Synthesis," Harper & Brothers) that "future human progress is dependent on an increase of intraspecific (i.e., within the same species) cooperation until it preponderates over intraspecific competition." He sees the future of man in the development of man's capacities. "There are many obvious ways in which the brain's level of performance could be genetically raised—in acuteness of perception, memory, synthetic grasp and intuition, analytic capacity, mental energy, creative power, balance, and judgment." "Increase of control, increase of independence, increase of internal coordination; increase of knowledge, means of coordinating knowledge, of elaborateness and intensity of feeling—those are trends of the most general order."

He also speaks about a ". . . . widespread fallacy—namely, that natural selection and the adaptations that it promotes must be for the good of the species as a whole, for the good of the evolving type pursuing a long-range trend, for the good of the group. . . . In actual fact," he states, "we find that intraspecific selection frequently leads to results which are mainly or wholly useless to the species or type as a whole." "This conclusion is of far-reaching importance. It disposes of the notion, so assiduously rationalized by the militarists in one way and by the laissez-faire economists in another, that all man needs to achieve further progressive evolution is to adopt the most thorough-going competition: the more ruthless the competition, the more efficacious the selection, and accordingly the better the results." . . . "But we now realize that the results of selection are by no means necessarily 'good,' from the point of view either of the species or of the progressive evolution of life. They may be neutral, they may be a dangerous balance of useful and harmful, or they may be definitely deleterious. For the statesman or the eugenicist to copy its methods is both foolish and wicked."

social ethics based on economic superiority rather than on the principles of justice. The result was an open fight between labor and management, and a half-hidden, smouldering class struggle between those who could afford the benefits of technological progress and those who could not. These ills, with their resultant monopolistic and fascist tendencies, finally led to repeated world wars which were cruel attempts to win capitalistic competition, and to check the upward spiral of the social progress so vigorously undertaken by the American and French revolutions. Our generation must stop the recurrence of these wars by understanding the hazards of a planlessly expanding industry which, by the blind dynamics of competition and profit, automatically leads to conflicts on a world scale.

The social and economic chaos of the world and the intellectual, emotional, and spiritual misery of the individual are appalling. There is, however, no use blaming earlier generations or specific nations whose actions apparently laid the basis for the prevailing confusion. What they did and how they did it were the effects of short-term measures resulting either from lack of imagination or class-determined actions and social ignorance. It is the duty of our generation to point out this fact in order to counteract the assumption that a providential power is behind human shortcomings and an injurious economic and social machinery; that not we but our ancestors are responsible for our plight. We can hope for improvement only after we have surrendered metaphysical interpretations in favor of a scientific analysis of human history. Tradition is man-made and must be constantly reevaluated, adhered to, or discarded, depending upon fundamental, common needs, not upon delusions which only extenuate social guilt.

By concentrating insight, passion and stamina, we may recover the neglected fundamentals. Our generation must accept the challenge to reinvestigate the elements of healthy living so that these can be used as yardsticks to clarify conditions around us. By integrating this newly gained knowledge with the existing social dynamics, we could direct our steps towards a harmony of individual and social needs.

the inalienable rights

The industrial revolution started with an enthusiastic emphasis on human values. The American and French Revolutions were test fights. Although the change from handicraft and shop-manufactured goods of feudal society to modern machine production was a technological shift, the accent was in the beginning not so much on economic aspects as on biological and social ones. This was even more strongly emphasized later when the individualistic nature of the crafts was superseded more by the social character of machine production in factories. The enthusiasm generated by the slogan "liberté, fraternité, égalité" quickly liquidated the paternalistic transgressions of the nobility; and the preamble to the American Declaration of Independence, written years before the French Revolution, stated "that all men are created equal, that they are endowed by their Creator with certain inalienable rights: that among these are life, liberty and the pursuit of happiness: that to secure these

rights Governments are instituted among men, deriving their just power from the consent of the governed: that whenever any form of Government becomes destructive of these ends, it is the right of the people to alter or abolish it and to institute new Government, laying its foundation on such principles, and organizing its powers in such forms, as shall seem most likely to effect their safety and happiness."

The creative bourgeois forces had the sincere intention of making these principles work. However, the task of building a new society was enormous, and the methods of realization were limited by the unconscious dependence upon the previous structure. The bourgeoisie concentrated all its power on the task of breaking the might of the nobility. In so doing it moved into the place and function of the feudal master. Where the prince had previously reigned, the merchant was now the ruler. But he was far from sharing his liberated life with the fourth class—the workers. The bourgeoisie fought against the discriminations of the class above it, but inherited the ancient ideology of superiority over those on the next lower level with whom it was not considered fit to share the responsibilities of government. In fact, in the later phases of capitalism, the nobility, otherwise purely vestigial, was permitted further existence in order to traditionalize that myth of superiority.

specialists

Industry expanded quickly. The happily prospering businessman needed a vast number of mechanics, engineers, and supervisors to fulfill the profit requirements of an economic strategy which served exclusively the demands of mass-production prosperity. The common denominator was quick specialization, without any consideration of biological fundamentals. Vocational schools were founded for the required specialists. Fields of production were specialized and segregated from each other in the hope that the output would be greater if they were not distracted by manifold interests. Creative abilities, concentrated on limited problems, produced stunning results, expanding the boundaries of the capitalistic economy.

The wheels of industry turned fast and prompted a clear division of all labor, neglecting everything but these divided functions. All former responsibility and pride of the craftsman in the wholeness of a product was now eliminated. Participation in the mass-production process was limited to the execution of a small detail. As the laborer was deprived of the incentive and assurance of working for a creative result dependent upon his abilities for completion, the vital fluid which, as in a battery, carries the current from one unit to the other, evaporated. He became inanimate, working in the maze of tunnels and gangways of the specialized labyrinths.

With growing industrial opportunities the entire educational system attained a vocational aspect. Schools lost sight of their best potential quality: universality. They lost their sense of synthesis to the extent of a complete separation of the various types of experience. On the other hand "prosperity" increased, and with it the temptation to enlarge profits. Everyone seemed satisfied. Production figures and balance sheets "spoke for themselves," being sufficient justification of training for profit. High

premiums were paid for labor-saving devices, automatic machines. The specialists, proud of their abilities which could be translated into dollars and cents, knew more and more about less and less. With the exception of a few, their complex biological capacities became inert, their vision narrowed.

moral obligations diminish

The specialists had much detailed knowledge but their work floated in the air, missing both human and social direction. They were busy within their own territory of specialized tasks which had trained them to "mind their own business," neutralizing human sympathies, the natural social reflexes of a healthily developed individual.

This was the age of isolation, marked by fierce competition between specialists in the same field who at the same time maintained an attitude of *laissez faire* toward all others; consequently lessening the sense of obligation to cooperate, and fostering an unwillingness to share in the complex problems of society. The specialists worked to the best of their ability, aiming at an optimum performance of their given task. But their actions were determined by unrelated thinking, without the broad vista of social planning.

Early capitalists had accepted the basic premise of protestantism that man's greatest virtue is his conscience, responsible only to himself and God. They communicated personally with "providence" when a decision had to be made, and felt themselves—rightly or wrongly—as executors of God's will in the management of their merchant empires. Today no one feels even this responsibility, neither the abstract stockholder nor the usually inactive board of directors.

Irresponsibility prevails everywhere. An advertising artist, for instance, makes a layout for the sale of a product. He is responsible for nothing but his own art; that is, his professional standard. The merchant sells the product which is advertised. But he is not responsible for its possibly inferior contents, as it is already packed before it reaches him. The manufacturer is not responsible either because he only finances the production; the formula comes from the hired staff of a research laboratory trained to produce results which will compete with products on the market. Altogether, responsibility has been subdivided to the evasiveness of the microscopic.

indivisible education

At the dawn of human history preliterate education was by myth and folktale which had nothing but the spoken word to wield influence. Boundless fantasy created test cases of human endurance, courage, kindness and intelligence, instilling in the hearer a deep feeling of responsibility by the inevitability of cause and consequence: the good was rewarded and the evil punished, and it was up to the hero to choose the right side. The human urge to follow great examples, and to continue the threads of the old tales, inspired originality, challenged skill, and broadened knowledge. The solutions of the heroic figures were ideal solutions of problems facing man. These provided him with guidance and a deep inner security embedded in a greater tradition that had found ways of coping with life. And everywhere, they were surrounded by paintings, sculpture and architecture.

Later, education, already removed from the close contact with the elements and the soil as in Greece, had to broaden its scope. Mind as well as body had to be developed simultaneously; skill and shrewdness were no longer enough. In the Greek gymnasium the curriculum of elementary and high school (to the age of sixteen) consisted of play and sport "in order to eliminate the doctor" as Plato said. When social adjustment and health were well established, the education of the mind was started. Emotional development was molded by contact with the arts, especially through music. Even when learning mathematics, the pupils sang the rules in chorus.

In intellectual training, importance was given to the grasp and enjoyment of logical concepts, categorical thinking; the organized approach to problems, the ability to contemplate and think independently.

official and unofficial education

In the Middle Ages the "leader" education of the privileged benefited only a small number of people. But within this small group the emphasis was again put upon the *integration* of *all* abilities, including sports, music, science, philosophy, history, literature, sculpture, and painting. In that society, until the French Revolution, the toilers had the role of beasts of burden—no literacy was needed for their work.

Yet even they enjoyed on a modest level, a totality of existence through their arts, crafts, and folk festivals, songs, music, and dance and an all-embracing common religion.

This preliterate culture was destroyed by the industrial revolution because skilled and semiskilled labor had to be acquainted with a multitude of printed technical instructions. This necessity did not seem to be a bad basis for a democratized general education which had long been the desire of visionary educators. A wholesale literacy seemed at first to open new and happy vistas for everyone. But, paradoxically, mass distribution of schooling accomplished a negative miracle. The speedy dispensation of education for *immediate* use neglected biological orientation without which the urge for creative activity was lost and with it the most important aid to maturity and judgment. It provided the masses with a quick training but threw overboard its

"But I thank God, there are no free schools nor printing, and I hope we shall not have these hundred years; for learning has brought disobedience, and heresy, and sects into the world, and printing has divulged them, and libels against the best government. God keep us from both." (Sir William Berkeley, governor of Virginia, in the year 1671, in answer to inquiries by the lords commissioners of foreign plantations. In William Waller Hening, "The Statutes at Large." N. Y. 1823. Vol. II, p. 517.)

King James II, on ascending the English throne in 1685, sent this instruction to Governor Dongan, in New York: "And for as much as great inconvenience may arise by the liberty of printing within our province of New York; you are to provide by all necessary Orders that no person keep any press for printing, nor that any book, pamphlet or other matters whatsoever be printed without your special leave and license first obtained." (In John Clyde Oswald, "Printing in the Americas.")

purpose, namely, that "not knowledge but the power to *acquire* knowledge is the goal of education."[•] Exactly this was circumvented. The masses received a training by verbalization, emphasizing the process of receiving instead of producing. The goal was not to express oneself, to think independently and be alert, but to "apply" education for running machines according to instruction.

This may not have been obvious at the beginning of mass education. Only after the machine age had shed its revolutionary character as the great liberation from the toil and slavery of manual labor, did its masters think of methods to stabilize the privileges of a new ruling class. In addition to law and justice, which were amended to handle overt offenses against the status quo, other, more subtle devices for its preservation were found. Among these devices the most efficient was and still is the *unofficial* education which tries to confuse even the meager knowledge handed out by the official education in order to make it ineffective for social orientation. This unofficial education is the sum total of a thousand forces which try to influence public opinion, from advertising to town hall meetings, from art to science; a mighty propaganda machine run by intricately interwoven interests of lobbyists and pressure groups, monopolists and hired politicians from whose tentacles there is almost no escape.

confusion around science

As common sense grew into organized science and scientific research became more and more independent of metaphysics, the scientists had quite a battle to stabilize their hard-won new positions. Complications arose when they tried to investigate subjects which were considered taboo either because they served the interests of a socially privileged group or because they were rooted in the theological sphere of the supernatural.

For example, the theory of evolution of the species of Darwin was considered as dangerous and immoral as were the economic studies of Marx and the psychoanalysis of Freud.

The bourgeoisie found themselves in a great dilemma. On the one hand they needed organized science because research was the great reservoir from which profit-making inventions could be developed; on the other hand, science was a potential explosive capable of destroying beliefs essential for the status quo.

Since Galileo's mechanistic statement: "The goal of science is the mathematical and quantitative formulation of all experiences and relationships," science has been constantly fighting for its own definition. Galileo's definition was in tune with the 19th century idea of specialization which segregated the fields and listed them without relation to each other.

Francis Bacon's words crystallized the issue better. "There is another great and

[•] stated by J. H. Pestalozzi (1746-1827) one of the great educators of history.

"He who has science and art has religion. He who has neither, needs religion," said Goethe.

"The supernatural is in part the region of the natural that has not been understood, in part an invention of human fantasy, in part the unknowable. Man must not attempt to put off any of his burden of responsibility onto the shoulders of outside powers. To become truly adult, we must learn to bear the burden of incertitude. The most difficult lesson to learn is that irrational and intolerant certitude is undesirable. When men assert that the scientific approach is incomplete it is because they are mistaking an early stage in its growth for full development." (Julian Huxley)

powerful cause why the sciences have made but little progress. It is not possible to run a course aright when the goal itself has not been rightly placed." This was nearer to the greater concept that science is the body of ordered knowledge which can be used most productively by being related to a social goal. The more this idea gained in popularity, the stronger grew the efforts of certain business groups to neutralize the social function of science and emphasize its application for business only. It was stated time and again that scientists have to be neutral, objective, and not take sides in any case. "Objective science" had the same connotation as *l'art pour l'art*, that is, minding one's own business. Science was considered as a lucrative method of research and as such was commandeered for technological and industrial development. It was further declared that scientific teaching is not contradictory to theology or metaphysics. Consequently, in spite of such scientific facts as are known, the axiom of submission to supernatural authority, belief in manifestations of divinity in human life and in the offerings of nature, were retained as the fundamentals of education. The obvious contradiction between the two types of teaching came to cloud the thinking of the individual, burdening him with a double loyalty that was torn between what is vaguely referred to as "intellect" and "faith."

Individual as well as social problems, from child education to the conduct of world wars, have been and are being decided in this state of confusion, the emotional-sentimental or the realistic-scientific argument being used, depending upon the advantage to the powers involved.

the propaganda machine

Besides the basic ideological confusion concerning "objective" and "subjective" truth, a widely organized advertising, publications, books, fairs, exhibitions, press and radio, bombard the public with information desirable for the protection of vested interests. This service is rapid and versatile and covers a multitude of subjects without being concerned with human or social essentials. It simply stuffs the public with spot news, spectacular but unrelated facts. If there are no "thrillers," they are deliberately manufactured. The emotional life of the individual becomes filled with worthless schemes. Being in the midst of a thousand details, but missing all fundamental relationships, his world becomes shallow. The public is eager to learn; but without having been taught to think analytically, it succumbs to the influence of flash-quick commentators hired by, or unconsciously servile to, pressure groups. They fill the minds with straw and prejudice; they machine-gun their victims with half knowledge, conglomerations of significant and insignificant facts. Not given the tools of integration, the individual is not able to relate all this casual and scattered information into a meaningful synthesis. He sees everything in clichés. His sensibility dulled, he loses the organic desire for self-expression even on a modest level. His natural longing for direct contact with the vital, creative forces of existence becomes transformed into the status of being well informed and well entertained. Typical examples are the radio quiz programs which offer cash to the best memorizer; the comic strips which deal in episodes with-

out any psychological foundation; the round table discussions which always present both sides, with the wittiest and not the wisest drawing the applause; and—above all—the digest mania which tailors fiction and fact till they fit a prescribed number of pages and a predetermined attitude of the group financing the publication. In all these, the public is fed predigested pap by commentators as a substitute for independent thinking.

careerists

People are taught that the best way of living is to use other people's energy, other people's results. They buy not only material goods on the free market but also emotional commodities. Specialists in entertainment provide for a passive recreation. The industrial era marks the extinction of the amateur and the arrival of the careerist, whose only aim is to commercialize the means of expression; that is, not to produce out of conviction, but merely to deliver technical skill for whatever subject is asked. Art is taken not as elevation of individual effort through the sincere expression of feelings or as evoking an intense range of emotional experiences, but as an escape or *ersatz* in a kind of spectator's art.

In the past, group activities gave the people a feeling of solidarity, coherence, and articulation. At present they cannot even celebrate. Jubilant festivals of former times are transformed into dull fairs; eruptive and expurgating carnival into organized parade, an event for the benefit of parking lot owners. Canned music, phonographs, films and radio have killed folksong, home quartets, singing choirs, market plays, *commedia dell' arte* productions, without canalizing the creative abilities in other positive directions.

To measure up to the gigantic scale of machine production the most intensive and genuine of human standards should have been marshaled. To be specific: The biological evolutionary progress of man was possible only through the development and constructive use of all his senses, hands, and brains, through his creative ability and intuition to master his surroundings; through his perceptive power, conceptual thought, and articulated emotional life. But concomitant with the stabilization of the industrial revolution these biological functions were suffocated under the tinsel of an easy-going life full of appliances and amenities, much too overestimated in their value. Man who is by nature able to express himself in different media allowed these most valuable biological potentialities to be amputated or paralyzed.

It is an individual as well as a social waste to have eyes and not see; ears and not hear; to destroy the endowment of instincts to create. The result is an atrophy of capabilities, a step-by-step deterioration. Man's strong nature may endure for generations but the end is disintegration. The biblical statement that the sinner will be punished even unto the third generation appears here in a new light. Man, as a whole, is affected. He is gradually reduced to a blunt tool and ignorant of his needs. He is forced to fall back into passivity so that he no longer functions through an integration of all his abilities.

The unofficial education forced men—worker and employer alike—into a fallacious conception of their role in society. They were taught to master a ceaseless competitive rush for the utilization of the earth's treasures and consider money the sole measuring rod of success. They were turned into human machines with record output in specialized fields.

But specializing the individual too early leads to a tragic impasse: to the neglect of physiological and psychological impulses of acquiring and releasing a broad range of emotional and intellectual experiences.

Admittedly this complex world cannot exist without the arduous detail work of the specialist. But the education of the specialist should not start with the training of a single ability before a harmoniously related, all-round education has been completed. This specifically must be the difference between the new and the old specialist. Otherwise flexibility and adaptability will be thwarted. The new specialist will have to integrate his special subject with the social whole. This integration must be based upon a carefully fostered intuitive *and* reasoning power, the result of emotional and intellectual development in balance.

At present, there is a trend to eliminate or reduce the "cultural education" in the grade and high schools and replace it with vocational training. The argument is that because only ten or fifteen percent of the high school graduates go on to college, "the others should be prepared to take their places in the business world so that the first day a graduate is working he can make money for his employers".

Thus, why teach humanities, cultural subjects, when the greater part of the pupils will become workers, technicians, clerks? The others, in the professions, will have a liberal arts education in college.

It is of utmost importance to show the fallacy of this reasoning. Exactly because the majority of the American boys and girls never go to college, everyone should have his cultural education in the high school. Otherwise the majority of the people will not have it at all. The consequence would be an educational and cultural monopoly of a minority making an empty shell out of democracy.

liberal education

"Liberal" education, which is considered a positive step to counteract a one-sided vocationalism, is at present not much different from it. Vocational education provides external skills while liberal education furnishes the skill of verbalization, both usually a mechanical accumulation.

Vocational education, without the brake of the newest technological information, often conditions the student to obsolete patterns of approach and execution; similarly, the classics of the liberal arts—without the brake of social thought—may condition the student to petrified forms of class-determined thinking. Though this is, for the uninitiated, hard to detect, liberal education easily can lead to the worship of the past and can make zealots out of employers and employees alike. Saturated with the "absoluteness" of past philosophical schemes and thought categories, they rigidly carry out formulated or intimated orders. There are cases where instead of inhaling the often paralyzing atmosphere of liberal education, its evolutionary, historic substance has an impact upon the student, so that he learns to grasp the mechanics and the quality of an intellectual performance per se. But without a biological and social goal even such an impact may act as a two-edged sword. It can cut a path toward a social or an antisocial direction.

stabilizing the transitory

Superimposed upon official schooling is the more powerful unofficial education. Research institutes, opinion polls, donations, scholarship grants, create a perfect framework for any required type of influence. The consequence is that ephemeral aims transform gradually into solid facts, stabilizing the transitory.

The emphasis on quick vocational education, for example, was not an order issued

by the industrialists to the educators. The technical and commercial forms of vocational education became the desired goal through the constant ridiculing of the "impractical" professor and the "idealistic" intellectual, and glorifying the "hard realist" who knows the "practical" needs of the country and "serves progress." Attempts to counteract any such process usually come too late.

To redirect the industrial world toward a balance between a biologically sound human existence and the present industrial society, and to create a planned cooperative, economy, requires almost a revolution. Because of the hidden or open animosity against reform, the well-knit influence-team of a purely economic leadership usually condemns or suppresses constructive proposals for necessary changes.

second-hand facts

The severe criticism of the present educational system has become the common property of every intelligent observer. In the book "Speaking of Man," by M. F. Guyer (Harper & Brothers) is the following statement: "Unfortunately much of the young student's efforts . . . demand memory and skill in the mastery of symbols, and are therefore not only not conducive to reflection but may even be antagonistic. Consequently, we need an equal amount of training in observation and judgment to counteract this danger. Yet such corrections are still largely lacking in our schoolwork. . . . Hence the phonographic mentalities—insofar as mentality is discernible—which confronts us in our high schools and colleges."

One has to add to this a socioeconomic point: the high valuation of the school as a place of education makes most people believe that in visiting one they have already accomplished the process of education. This puts a false emphasis on the purely receptive part of the learning act. The passive attitude is especially strong with people who believe only in the economic benefits of education, its value to be measured in dollars and cents alone. In reality, only a give-and-take action—in the language of education: creative collaboration—can lead to results.

Every epoch has its own theories about education. Today, for most people formal education merely means an abbreviated, intellectually condensed form of other people's experiences, the result of which can easily be utilized to earn one's living. To be well educated today one must have memorized the seemingly useful experiences of the past in order to be able to repeat them mechanically on the proper occasion. This type of education had at one time a kernel of truth in it. It was and is essential that mankind assimilate experiences of the past but not literally, not without critical analysis. Tradition must be dynamic. It cannot be a creative agent if it is mechanically adopted and changed into empty convention; if its content is limited to verbalizations only, ignoring one's own experiences, observations and deductions; if it becomes the repetition of repetitions of repetitions. To memorize facts one has never experienced will result only in showy demonstrations of unrelated learning. This is the "Information Please" culture where the participants shine in admirable versatility. In reality those participants represent only encyclopaedic symbols. They personify an auxiliary instrument functioning with the *semblance* of a meaningful scheme. They are the prototypes of an education which advertises learning through quantitative verbal information, turning away from the organic practice of self-experience and self-expression. When such "derogatory" matters as arts, crafts, and machine technology are regarded as ballast and thrown out from liberal arts education, the student is left in a thin atmosphere of mere verbalism.

attempts at improvements

It is obvious that a fundamental orientation is more rewarding than the knowledge of incoherent details. Naturally, through the ages, every type of education from kindergarten to university tried to approximate this idea and set up a framework of cross-fertilization of thoughts. But it makes a difference whether in practice this leads to a synthesis of knowledge-elements or only to an accumulation and juxtaposition of second-hand facts.

The Montessori kindergarten made a good beginning. It brought the child into the atmosphere of correlated activities and of complex dealings through re-enacting the

metropolitan adult life in miniature. This had its points. It organized in a short time psychophysical experiences which otherwise would have been only casually and insufficiently accumulated. It brought the child into contact with the group and made him socially conscious. However, Montessori had a shortcoming. It neglected the child's ability to transform the accumulated experiences into *creative* action. The imagination of the children in the Montessori kindergarten easily became flattened by being turned to immediate practical applications. To be sure, a part of their potentialities were used, but fantasy and originality of solutions were ignored.

Grade and high schools are experimenting today with "progressive" schemes. The program includes independent investigation accomplished by the students and a free study plan offering opportunities for experiencing the realities of life. The difficulty here lies, in many instances, in the fact that the exercises and problems lead the student only to a collection of data with the aim of a verbalized performance. The possibility of a simultaneous creative concept which would guarantee a chance to synthesize the results is disrespected. In the future, if progressive education is to be successful, it has to correlate the verbal performance of acquired knowledge with other means of expression such as painting, sculpture, poetry, play and music. Then it may better fulfill its revolutionary aims.

The importance of coordination has been recognized by colleges and universities which introduced new professorships for the interrelation of faculties to bridge the existing gaps between the different departments. Yale University found a good name for this task of integration, "The Institute of Human Relations," but as yet not the proper function. At the University of Chicago, the College for Undergraduates made a good beginning in studies with a threefold schedule in survey courses of natural and social sciences as well as humanities. The courses still neglect the fact that social thought has to be taught by every teacher just as English has to be part of all the courses. At the same time capacities of the student must be considered also on the technological and artistic plane, beyond verbalization; that is, his potential expression by means other than the word.

In order to bring education into a state of equilibrium of hand and brain, intellect and emotion, the task is to give the student enough opportunity to use his brain together with his emotional potential; to provide for sensory experiences of eye, nose, tongue, and fingers, and their transformation into controlled expression. The student must be allowed to find the facts himself by experiment with his material. He should not be "led" in any certain direction; his brain should not be filled with plaster casts, nor at too early an age with books descriptive of second-hand experience ineffective for activating his thinking, or with books beyond the limit of his understanding. Education must be the opportunity to make one's own discoveries and to form one's own expression, providing the purposeful fusion of social tradition with the individual's experience, practice, and conclusions. The knowledge of historical continuity is one of man's most valuable steppingstones in his evolutionary progress. The purposeful accumulation of experiences can protect him from the repetition of mistakes, so that

Education should bring to the individual dignity and refinement of his human status, furthering the better and more conscious use of his intellectual and emotional capacities. But naturally, he has to have the security, too, that in addition to these benefits he also will participate in material accomplishments. Earnest consideration must be given to the freedom from want, to a decent living standard. This should begin with the teachers themselves. In China, for example, teaching is the highest esteemed profession among social groups. In this country the businessman is supreme. This is shown in the social and economic evaluation of the intellectual professions. The teachers are paid not on the basis of their educational proficiency and human excellence but by arbitrary fixation of the age groups they teach. The best teachers, however, belong in the kindergarten and elementary schools as there lies the decisive beginning of educational influence.

In democratic countries of Europe such as Switzerland and Sweden, the greatest care is paid to the education of the youth before entering the universities. This is possible only by an adequate teacher training in which the whole community is interested. For example, in Switzerland every teacher for the grade schools is appointed for life by the vote of the citizens of the respective districts. Their payment guaranteeing a decent life is according to the belief that no democracy can exist without the most careful education of its citizens.

When this country also comes to realize the importance of competent teachers in kindergartens, elementary grades, and high schools as well as in the universities, and pays them adequately to secure the calibre of teacher who will really teach, and not merely relay information, an important step toward better education will have been made.

his creative power can gradually be saved for socially productive tasks. This productivity should be the alpha and omega of education, the translating of all the elements of learning into a creative sociobiological living.

The solution is that man must have the insight and the intellectual power to utilize the entire body of culture and civilization. He cannot turn away either from past knowledge or from present reality. He must face both with all their ramifications and possible interferences and be prepared for the fact that their waves can strengthen or extinguish each other. This involves selective ability in continuing specific trends or abandoning others if they prove to be damaging. Teaching focussed on learning for learning's sake will always bypass the ultimate objective which alone can give sense to the attempts of integration. Choices are easy if the goal is clear. Knowledge should not be suspended in a vacuum; it must be in relationship with sociobiological aims. This integration gives to human life content, direction, and a sense of security.

The large scope of such an objective should not be frightening. The hundred year's struggle of the workers for solidarity shows that there is nothing more satisfactory to an individual than to belong to a group which has a social goal and through it a firm coherence.

With a social goal, education will develop everyone's capacities for his best performance; at the same time it will provide the basis for group cooperation since a common aim is the best activating agent for the efforts of the individual.

A social goal can incite most valuable qualities in young people, unselfishness and devotion to a task even if the work does not promise a specific reward. But only when all interests are focussed on social justice and social harmony will the essential role of the individual be secured in the realization. Such a concept will produce coalescence and will give a mighty stimulus to the individual for his personal growth. The better he learns and works, the more his usefulness increases within society: a supreme identity of personal and social gain! Once this knowledge is attained, individual ability cannot be used for competitive suppression of seemingly lesser talents. Since everyone's best is needed, cooperation must become the standard. Thus a new education can lead to a simultaneous affirmation of individual and social needs and can become the instrument of a happier and healthier life.

It is a generally accepted premise that capitalism with its industrial technology has to serve in the most economical way for the realization of profit. However the "economical" should be subordinated to human requirements to make technology a benefit instead of a curse.* We must control the application of material, technique, science, and art not only economically but also biologically and socially. To meet the manifold requirements of this age with a definite program of human values, there must come a new mentality and a new type of personality. The common denominator is the fundamental acknowledgment of human needs; the task is to recognize the moral

* "Think in efficiency, not in dollars and cents." (Gropius)

obligation in satisfying these needs, and the aim is to produce for human needs, not for profit.

the task of this generation

Each generation differs from the preceding one in the determination of its task. The task of this generation is to search for its roots. It must try to understand the significance of natural functions so that everyone may become aware of the essential purpose of living: the preservation and refinement of the biological nature of the individual within a harmonious social existence. The value of such an existence will be measured in terms of cooperation, social usefulness and personal happiness. This new life requires a new methodology for approaching problems; a social mechanism of production and a creative education.

But the teachers of mankind are not only the personnel in schools, colleges and universities. To reach different temperaments, intellectual, verbal explanations alone are not effective. There are a great number of other approaches needed. The arts, for example, can take the individual by storm through sensory experiences, directly by feelings, without involving too much intellectual participation. The arts can play an important role in the re-education of the people.

For the time being everything is in a state of flux. The best we can do is to expose ourselves to contemporary art and its formulations which are based mainly upon the direct sensory impact of its means. The result is a grasp of new imagery and its new rhythmic structure; a purification and strengthening of the perceptive and conceptual faculties. This new imagery is the essence of the manifold potentialities of this yet-chaotic world translated into a language of directness and intensity.

It is often said that the European high school (gymnasium) had a higher standard than the American because through free public education here anyone can go to high school and the less talented pupils are said to retard the advancement of the more talented ones. The implication is that in Europe only talented pupils registered in the "gymnasium." That is not true. The European high school (gymnasium) demanded rather high tuition fees. It was an agency for class education and had little to do with any principle of ability selection other than the parent's purse. The high educational standard came from the teachers. They were able to carry the less talented youth through the scholastic curriculum. This result could be achieved in this country, too, if the educational requirements of the teachers were raised.

capacities

It has to be said again and again that every healthy person has deep within him the biological capacity for developing such a language. Everyone has a creative nature. Everyone is naturally equipped to receive and assimilate sensory experiences; to think and to feel. The schools must know the *technique* of developing this natural equipment in the most formative years of youth.

That a general standard of self-expression without specific talents can be reached is proved by the age-old European education of the wealthy where a relatively high cultural average was produced through the tutor system or by private schooling. It has to be said again and again that everyone is sensitive to musical tones, to colors, to touch and space relationships: that is to say, everyone is able to participate in the entirety of such experiences and everyone can produce non-verbal expression in any medium. Every normally healthy man can articulate the material of the musician, painter, sculptor just as he can articulate language, the verbal material of the speaker. The truth of this is apparent in everyday life. Individuals in moments of emergency

"... the art of primitive culture seen now as the whole ritual, the symbolic expression of the meaning of life, appeals to all the senses, through the eyes and ears, to the smell of incense, the kinaesthesia of genuflection and kneeling or swaying to the passing procession, to the cool touch of holy water on the forehead. For Art to be Reality, the whole sensuous being must be caught up in the experience. Our present practices, by which people sit on stiff chairs and listen in constrained silence to a piece of music, or wander in desultory unpatterned groups in an art gallery looking at framed pictures hung in desperate disregard of any relevance which might exist among them, is the very opposite process."

"... in primitive societies, the artist is not a separate person, having no immediate close relationship to the economic processes and everyday experiences of his society. The concept of the artist whose gift sets him apart, or who only becomes an artist because his life history has set him apart, is almost wholly lacking. The artist, instead, is a person who does best something that other people, many other people, do less well. His products, whether he be choreographer or dancer, flutist or pot-maker, or carver of the temple gate, are seen as differing in degree but not in kind from the achievements of the less gifted among his fellow citizens. The concept of the artist as different in kind is fatal to the development of any adequate artistic form which will satisfy all of the

break down conventions and inhibitions and perform "miracles" beyond their "normal" capacities. Another proof is offered in the works of children and primitive peoples; their spontaneous expressions usually spring from an inner sense of adequacy not yet shaken by the doubts of a perfectionist. Children sing, draw, paint, dance in moments of emotional intensity. These types of expression are not always synonymous with the "art" of the "professionals" but they are examples of a life governed by inner necessities. Without this emotional articulation and expression life becomes one great frustration.

fear

Fear and self-consciousness are the most serious psychological hindrances in life. Awed by reports of great achievements of historic personalities, most people become perfectionists. They "know" beforehand that their work cannot be worthwhile because they can "never" match historical standards. The result is paralysis of any creative attempt, brought about by the fear of being laughed at. Unfortunately, many educators promulgate the idea that certain celebrated accomplishments can never again be achieved. The students walk in the shadow of geniuses, often distressed that they can never attain such creative greatness. However, the instinct of self-preservation in young people will often react against such a vicious dogma of inferiority and will free them for their own individual attempts.

Every school should build up an elementary curriculum with exercises that do not allow a comparison of the student's self-expression with the work of a "genius." The student must gain a range of experience through his own experiments, form his own judgments, develop his own abilities before he studies the historically great. Then the student will discover in himself something resembling a sixth sense of which he had not been conscious before, a coordinating creative ability not to copy from, but to use indigenously. No matter how he employs this power later on, whether he uses it as painter, designer, lawyer, doctor, housewife, or bookkeeper, he will have gained a sense of joyous confidence in his own performance. If we could know point by point why in the present educational set-up the adolescent loses the directness, sincerity and intensity which he possessed as a child, we should have a powerful weapon against the prevailing tendency to produce automatons. • If the ban of self-consciousness and obsolete standards could be removed, everyone could retain the truthfulness of observation, fantasy and creativeness which are the preliminaries to expression, and—on its highest level—art. And art is the best means to fuse all the elements of personality.

the amateur

It is good to believe that some day the mechanics of art will be explained with greater clarity in scientific terms. Then it will be possible to understand more of its com

• A little boy, when asked how he had made such a beautiful picture, said that he "only thought a thought and just drew around the think."

sensibilities which are developed in individuals reared under the impact of these forms.

"Both of these differences, the difference between a ritual which involves all of the senses and our present artistic practices which fractionate the sensuous man, and the difference between an artist who is merely best of a host of fellow practitioners and the artist who is different in kind from men who are hardly his fellows at all, are not inherent in the nature of civilization as compared with the nature of primitive society. Our own middle ages, as well as many cultures of the past, developed complete, harmonious rituals which involved every type of sense experience, and the concept of the artist and the related concept of the fine arts are both special bad accidents of our own local European tradition.

"By making art a specially precious part of life, we have demoted it from being all of life, seen from one point of view. When this is done, everyone suffers—the 'artists' and all the people to whose lives significance might have been given."

(From "Art and Reality," by Margaret Mead in College Art Journal, May 1943, Vol. 4)

munity function as well as its vital importance to the individual. Psychoanalysis already shows through the mechanics of dreams the role of the subconscious existence. This justifies the hope that the sources and mechanics of creative work will one day also be unveiled. Then we shall be able to incorporate art not only into education but into everyone's daily routine.

In this sense art is the realm of emotional communication, inspired by the subconscious as well as the conscious existence. Its imagery is inherent in and connected with the sensory experiences which express a concept beyond the intellectual grasp, often the imponderable relationships of man as a biological and social species. This language of art has to be learned by frequent exposure to it. But even if psychological research should one day uncover the creative mechanics and the rich motivations of art, the aim would not be that everyone can or should become an "artist." Art cannot be taught, only the techniques to express a concept. This can lead to "art," namely, to an organization of the elements of expression directed toward communication and social coherence.

●
Formerly, in the academic art school, analyzing and imitating past works of art was enough to stabilize art as a profession. The assumption was that if you learn the rules and repeat the recipes, you will become an artist. But the better advice is: "Be yourself! Alert, honest and human!"

The sincere expression of the layman in any medium can be the start for "art." This is why the amateur is one of the hopeful promises of a future society. He is an authentic testimonial of the manifold abilities of the human being to act and react purposefully if emotionally stimulated.● "Art" may be the result of an inner drive, a relieving catharsis, an elimination of inhibitions and conflicts. It can be also a purgation of emotional overflow. Such an expression is the "art" by the people and of the people; art as part of the normal living, as natural as breathing. In such cases the expressions may have varied degrees of quality; "good," "better," "best," as the goods in a mail-order catalog. But only the person who is able to rise beyond private sensations and translate his intuitive grasp of the unadulterated problems of his time into imagery, into a coherent expression; that is, into visible, audible or tactile forms, can be "best." Such a peak—emotionally, technically and spiritually the highest—can usually be reached only by a "fulltime" worker on a broad basis of unceasing experiment, saturated in the knowledge and the spirit of past and present civilization. This does not mean that everyone who tries to express himself has to fall back upon the technical and spiritual heritage, the historical accumulation of the past. People may start with the eternal recurrent psychophysical reaction to their surroundings as well

● *An analogy from other fields may clarify this point. One does not have to be a judge to have a sense of justice, though there are professional judges. It would be a bad sign for our adaptability if only doctors had the knowledge of healing. Little children, for example, when ill, will not touch food. This is the intuitive impulse to protect the organs from further strain and leave the healing process to the body itself. "The best doctors in the world are Doctor Diet, Doctor Quiet, and Doctor Merryman," said Swift.*

as to the materials of expression, such as color, sound, volume, space. Theoretically, everyone may start out almost as prehistoric man, because even such a start would help him to gain an emotional "literacy," that is, the ability to articulate material stimulated by emotional impulses. This can lead to recreation and enjoyment through the aesthetic appreciation generated by experience and acuity of discrimination. But this is yet rare. Our culture is full of those illiterates who cannot read or write and the others—the illiterates of the emotional life, who live without ever attempting to translate their emotions into meaningful expression. To live without this means emotional starvation just as missing food means starvation of the body.

the function of art

Art is the most complex, vitalizing, and civilizing of human actions. Thus it is of biological necessity. Art sensitizes man to the best that is immanent in him through an intensified expression involving many layers of experience. Out of them art forms a unified manifestation, like dreams which are composed of the most diverse source material subconsciously crystallized. It tries to produce a balance of the social, intellectual and emotional existence; a synthesis of attitudes and opinions, fears and hopes.

Art has two faces, the biological and the social, the one toward the individual and the other toward the group. By expressing fundamental validities and common problems, art can produce a feeling of coherence. This is its social function which leads to a cultural synthesis as well as to a continuation of human civilization.*

Today, lacking the patterning and refinement of emotional impulses through the arts, uncontrolled, inarticulate and brutally destructive ways of release have become commonplace. Unused energies, subconscious frustrations, create the psychopathic borderline cases of neurosis. Art as expression of the individual can be a remedy by sublimation of aggressive impulses. Art educates the receptive faculties and it revitalizes the creative abilities. In this way art is rehabilitation therapy through which confidence in one's creative power can be restored.

the "professional" artist

The best representatives of the arts whether in music, poetry, sculpture, or painting, even in their single works, always express the spiritual state of the age. Today a painting or a sonata is a tightly woven fabric of which the historic warp may often disappear under the richly textured modern yarns of the weft. Nevertheless, the soundness of the weave is dependent on both. The contemporary artist organizes his work within this given historical and cultural framework, but he derives his subject matter from his social and spiritual interests. These are expressed in different periods with different means and themes, such as a still-life, a portrait, a landscape, or an

* "Culture" and "civilization" are used in this book as synonyms, though in German, for instance, a differentiation is made between the two: "civilization" is the term for the technological and "culture" for the humanistic sphere.

abstraction, all possessing a sensory directness as well as freedom, order, and harmony which are among the organic qualities of art. On the other hand the intensity of the artist's work is dependent upon the uniqueness of his purpose and his ability of transference. Thus the professional artist's solutions are dependent upon the existing body of knowledge in addition to the sociobiological components. But if he wishes to stir his audience and appeal to their senses, he has to create powerful new relationships. He can do so either by developing tendencies or by opposing them. The gradual elimination of the still existing feudal residues, that is, obsolete economic theories, obsolete patterns of individual behavior, obsolete sexual and family relationships is not an automatic matter.

It is unimaginable that, along with the economists, philosophers and politicians who advance suggestions for social changes, the most intuitive and responsive people in a society, namely, the artists, have no say. Tyranny and dictatorship, manifestos and decrees will not recast the mentality of the people. The unconscious but direct influence of art represents a better means of persuasion for conditioning people to a new society either by its projective or satiric-destructive means.

The true artist is the grindstone of the senses; he sharpens eyes, mind, and feeling; he interprets ideas and concepts through his own media. In the midst of vast social controversies he cannot escape that task. He has to take sides and proclaim his stand; indeed the artist has a formative ideological function, otherwise his work would be only an exercise of skill in composition. Hitler was aware of this. He propagandized trash, he tried to destroy modern art, science, and philosophy as the greatest sources of opposition to his vicious system of oppression. He banned the contemporary, the "degenerate" art, as he called it, from the galleries and museums, burned books, and forbade the teaching of Einstein's theories.

He sensed that the content of art is basically not different from the content of our other utterances. The only difference is that art is produced mainly by subconscious organization of the means implicit in the cultural and social setting of the period. To be sure, there are numerous opportunities for expression and research in all fields but among them only a few which are positively related and favored by the dynamic forces of the age. In intuitively choosing certain esthetic or technical problems, the most sensitive and advanced artist is a tool for the recording of the time-expressive contents. That is, form and structure denote definite spiritual trends. The work of the artist corresponds to the creative problems in other fields, complementing them in the structure of civilization of that particular period.

Art may press for the sociobiological solution of problems just as energetically as the social revolutionaries do through political action. The so-called "unpolitical" approach of art is a fallacy. Politics, freed from graft, party connotations, or more transitory tactics, is mankind's method of realizing ideas for the welfare of the community. Such a "weltanschauung" is transformed by the arts into emotional form, and becomes retroactive in the realm of the conscious existence. This suggests that not only the conscious but also the subconscious mind absorbs social ideas which are

then expressed in the specific media of the arts.* Otherwise any problem could be successfully solved only through intellectual or verbal discourse. The difficulty lies in mass participation. The masses are filled with a petit bourgeois ideology, the masculine superman ideal promoted by papers and radios, books and films—by the unofficial education which the people have been taught to enjoy in spite of lip service to casual revolutionary political ideas. Once their sensitivity is killed, they are unable to receive the message of art whether contemporary or old.

The success theory of the profit economy pays a high premium to the anti-artist. Artists are considered effeminate who do not have the stamina to participate in competition. This is not only untrue, as are most clichés, but tragic since at present art is perhaps the only field where convention does not completely suppress sentiment and where the omnipotence of thought and the independence of emotion are kept relatively intact. To follow the divining rod of intuition and expressive desire may often act as a psychological lifesaver especially in periods of hidden and open suppression of independent thought. The phrase that “the artist represents the consciousness and memory of his time” is a good characterization of his function. No society can exist without expressing its ideas, and no culture and no ethics can survive without participation of the artist who cannot be bribed.

Art represents the uncensored statement of its author; this is one of its most positive characteristics. No one but the painter, the author, the composer is the sole master of his performance. The simpler his medium and the less investment it involves, the easier it is to avoid possible censorship and to preserve the ways of genuinely free expression.

Through his sensitivity the artist becomes the seismograph of events and movements pertaining to the future. He interprets the yet hazy path of coming developments by grasping the dynamics of the present and by freeing himself from momentary motivations and transitory influences but without evaluating their trends. He is interested only in the recording and communicating of his vision. This is what materializes in his art. He cannot misuse such a situation. To be a “fulltime” worker, a “professional,” involves a moral responsibility. This is why the secured existence of the uncompromising and incorruptible artist is so important to society. If he does not have adequate tools and materials, he cannot produce his best. His records cannot be fluid

* Alfred Korzybski, the leader of the general semanticists, states that if a “translation is made into the language of lower centers—namely into ‘intuition,’ ‘feeling,’ ‘visualizations’—the higher abstractions gain the character of experience. By re-translating our higher order, verbal abstractions of relations and order into simplified but direct manifestations which can be visualized and felt, modern art affords immediate sub-cortical experience of essential structure.” (Quoted by Oliver Bloodstein in “General Semantics and Modern Art,” in “etc.” Vol. 1, No. 1, 1943)

This suggests the intertwined nature of human experiences and their expression. I question only the biological justification of discriminating between “higher” and “lower” orders of experiences. Biologically seen, they are of equal order and without their balanced, interpenetrated performance no satisfactory life exists.

and direct if he cannot consecrate his life to constant work in his craft, if he has to fight for minimum subsistence.

The silly myth that the genius has to "suffer" is the sly excuse of a society which does not care for its productive members unless their work promises immediate technological or economic applications with calculable profit.

"We must have now sciences at the places where formerly intuition directed us." (Frank Lloyd Wright)

Among the artists in the 19th century there are Philip Otto Runge in Germany, Delacroix in France, who had the reputation of being competent color research workers. They applied science to their art. But there is a reciprocity, too. Seurat, for example, with his pointillist art, intuitively anticipated the science of color photography.

Sometimes a whole chain of successive influences can be traced from science—to technology—to art—and back again to science. Examples can be found in the research of photographic speed exposures such as that of Muybridge, Thomas Eakins, and the industrial motion studies of Taylor and Gilbreth which were transferred into art by the futurists around 1912. This in turn influenced scientific studies resulting in the stroboscopic photodiagrams of Harold Edgerton, MIT.

Rodin, the sculptor, was fascinated by light problems in the time of Helmholtz' investigation of optics. As a result, Rodin introduced a new type of chisel-cut to achieve transparent shadows, in contrast to the heavy shadows of the renaissance sculptures.

At present it would be a great help for the painter to know more about scientific optics so that he would be able to make controlled light paintings without the use of pigment, with only polarized stresses of material; or by gratings (almost invisible lines engraved into a transparent surface) and lit from behind so that prismatic light effects could be produced at will for colored light compositions.

The new artist working with plastics inevitably has to take up scientific studies or else wait decades until the knowledge about plastics becomes a commonplace.

art and science

The task of the professional artist is not only to vitalize people but also to continue and synthesize spiritual traits. For this, besides the unconscious elements, he must have conscious source material, sound scientific outlook though not necessarily a method. But most people educated in the liberal arts, and frightened by badly-taught mathematics and physics, have an awed respect for science in any of its possible interpretations. Because of this fear, they are suspicious of an art which uses elements reminiscent of geometrical shapes, synthetic materials, and optical instruments.

In popular short-cut theories there is the problem of "chaotic nature" versus "organized machine;" sober science versus mystical religion; social planning against free enterprise. This is oversimplification. The eyes of the artist record cows and dynamos, trees and skyscrapers equally well. They represent visual raw material for him. And this is the real issue. The actual aim is sociobiological synthesis. This cannot be achieved without "laboratory experimentation," though this is another objection to contemporary art, voiced often by the layman. But without experimentation there can be no discoveries and without discoveries no regeneration. Although the "research work" of the artist is rarely as "systematic" as that of the scientist they both may deal with the whole of life, in terms of relationships, not of details. In fact, the artist today does so more consistently than the scientist, because with each of his works he faces the problem of the interrelated whole while only a few theoretical scientists are allowed this "luxury" of a total vision. The main difference between the problems of artist and those of scientist is the difference in the form of their materialization and grasp. Plastic art is expressed with means largely comprehensible by sensory experiences on a non-verbal level. Even if, as in old paintings, the creative impetus is screened by the logical presentation of a describable theme, it is not the landscape or still-life that results in art, but the creative act by which the subject matter is transmuted into visual form. On the other hand, a scientific discourse is stated in rational intellectual terms even if the impulse to it comes from subconscious regions of the intuition. On the basis of sentimental education, many still believe that the emotional depth of the artist will be endangered by the attempt to organize his elements consciously. But the artist ought not to be afraid of conscious traits in his work, as the conscious approach will be translated by him into terms affecting the senses. The conscious problems of research are on a rather modest scale anyhow, overshadowed by the intuitive forces and the subconscious mechanism of expression. In every art work there remains a great number of components which cannot be verbalized, only approached intuitively. Even product designs executed with a largely

conscious approach generally answer more questions than their producers originally expected they could. The reason is that so far product designs have shown the most obvious integration of intuition and science, form and function. Their analysis can sometimes be helpful in giving more effective information; it may stimulate new techniques in the subconscious transubstantiation of such information. Analysis can eliminate also the repetition of overused elements and create an inner security for new solutions.

II

new method of approach— design for life

Industrial design is a new profession. So far it has been more of an adventure than an exact knowledge concerning the demands of industrial production, its technology, sales and distribution techniques. If the profession should be stabilized, there is a need to analyze its requirements. In the past, the successful industrial designers of this country have come from stage design, painting and architecture—people with imagination and fantasy within the realm of the new esthetics, based upon mass-production potentialities, not hampered by the tradition of the handicrafts. The older the craft, the more restraining is its influence upon the imagination of the designer. It is easier to design a new product which is based upon the new sciences and technologies than, for example, to re-design the production-ways and shapes of pottery, one of the oldest handicrafts.

It is an old saying that "form follows function". This means that the shape of an object is defined by the work it has to do. After a million years of trial and error, nature has produced well functioning shapes, but human history is much too short to compete with nature's richness in creating functional forms. Nevertheless, the ingenuity of man has brought forth excellent results in every period of his history when he understood the scientific, technological, esthetic and other requirements. This means that the statement, "form follows function", has to be supplemented; that is, form also follows—or at least it should follow—existing scientific technical and artistic developments, including sociology and economy.

Economic considerations deeply influence and direct design. For example, design in this country is basically different from that of Europe. A country like the U.S., rich in resources, raw materials and human ingenuity can afford to be wasteful. Thus the economy in the United States has incorporated into its structure the frequent change of models and a quick turn-over, by declaring older models obsolete long before their technical usefulness has ceased. In contrast to this, the European design, based upon an old civilization and now specifically upon an export economy, tries to produce long lasting goods and to conserve raw materials. In other words, the European export economy requires that the consumers' wishes, to pay less and to buy less frequently, be taken into consideration because the money paid out for imports represents a loss in the importing country's economy.

At present, new export tendencies manifest themselves in this country, too. Not long ago we were mainly exporting money, now also industry must look for foreign commodity markets in order to utilize its production potential and avoid unemployment. Competition on the world market will sooner or later require a revision of the American idea of forced obsolescence, i.e., the frequent replacement of merchandise by a new "design" before the previous one becomes technically obsolete. What kind of cultural, social and economic changes such a revision will cause, is as yet difficult to forecast. However, one comment can be made: the theory and practice of artificial obsolescence leads—in the long run—to cultural and moral disintegration because it destroys the feeling for quality and security of judgment. Continuity of culture results from a primary concern for quality rather than for novelty. Instead of striving for "standards" leading to an organic civilization which should be the aim, the responsibility and the duty of the designer, the quick succession of "novelties"—the paradise of the salesman and advertising agencies—forces the designer to satisfy only the desire for the sensationally new in the exterior. Thus, "design" today is generally a bid for quick sale, usually nothing but an exterior cloak around a product. Its main characteristic is to be "different" although the function remains the same. The industrial designer is called in to "style" or "fashion" a product already engineered, and the more often he changes a "design", the more he is supposed to have contributed to the salesman's success.

●

High-pressured by the salesman, the industrial designer succumbed to a superficial "styling". In the last ten years this has meant "streamlining", just as a generation ago it meant ornamentation.

The speed and motion of our period justify "streamlining". But streamlining was originally invented for moving objects and there is hardly any reason for an ashtray to be streamlined. Thus, when every product is blown up like a balloon—we have to fight against it, as formerly we did against the mechanical utilization of symmetry with which everything, in previous periods, could be made "harmonious and balanced". However, certain elements of streamlining are exceedingly economical in production, especially since mass production methods of stamping, pressing, casting and molding are employed. They assist in easier production, assemblage and finishing.

Therefore a designer can best work if he is familiar with the art, science, social and economic requirements of his period plus the industrial processes and the basic mechanical principles involved in a certain problem. But it is not his task to compete with the engineer, nor should the engineer indulge in the idea that he can do a perfect design. It is their intimate collaboration which is needed, especially at the start, a mutual willingness to exchange ideas and yield to suggestions improving the production, the function and the "looks" of the product, that is, its psycho-physical perfection.



Fig. 1. O Institute of Design
Audrey Eiger, Roger Corsaw, Eileen
Gatechair, Jesse Reichel, Warren Turek,
1940

Experiments for hand-fitting tool handles
for plastic molding

By a peculiar inertia, the commercial tool
handles in plastics still imitate the old
wood handles turned on the lathe

axioms

The acquisition of technique and skills increases the expressive power of the individual; and with the accumulation of experiences his intellectual status is refined. This refinement in turn affects his emotional existence.

The process is one of interaction and mutuality.

Anyone who has experienced the mechanics of work in one medium, peculiar unto itself, will be capable of working successfully in other media too. The implication is that working with a new material demands—methodologically—the same insight into its properties and genuine use as was expended on the material handled previously. The prerequisite is the understanding that certain shapes arrived at and valid in one material cannot be satisfactorily imitated in another despite the identity of function.

Industrial designers and producers of goods often make the mistake of ignoring this axiom. For example, although the steel dies for mass-produced plastic moldings are different in characteristics from the lathe, which produced the “typical” old wooden handle for tools, the new molded plastic tool handles still look like the old wooden ones. Their designer did not understand the changed facilities for mass production. He unconsciously retarded progress in foisting obsolete lathe-shapes upon the new material. There are any number of similar examples. Metal desks often imitate furniture made of wood; electric lighting fixtures simulate candelabras or colonial oil lamps; the reinforced concrete and steel skeletons of architecture are

Fig. 2. Path of motion of motor cars in the snow
Another "inevitable" line quality caused by the tool (auto) on a plane (snow covered terrain)

Fig. 3. O Harvey J. Croze, 1944
Peeling paint

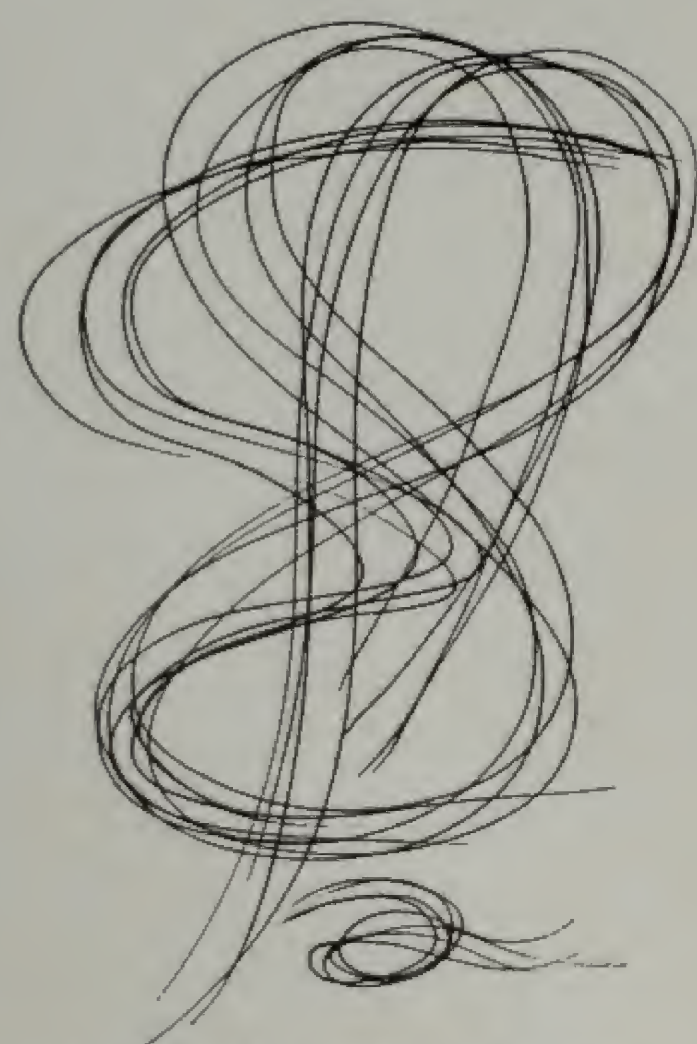
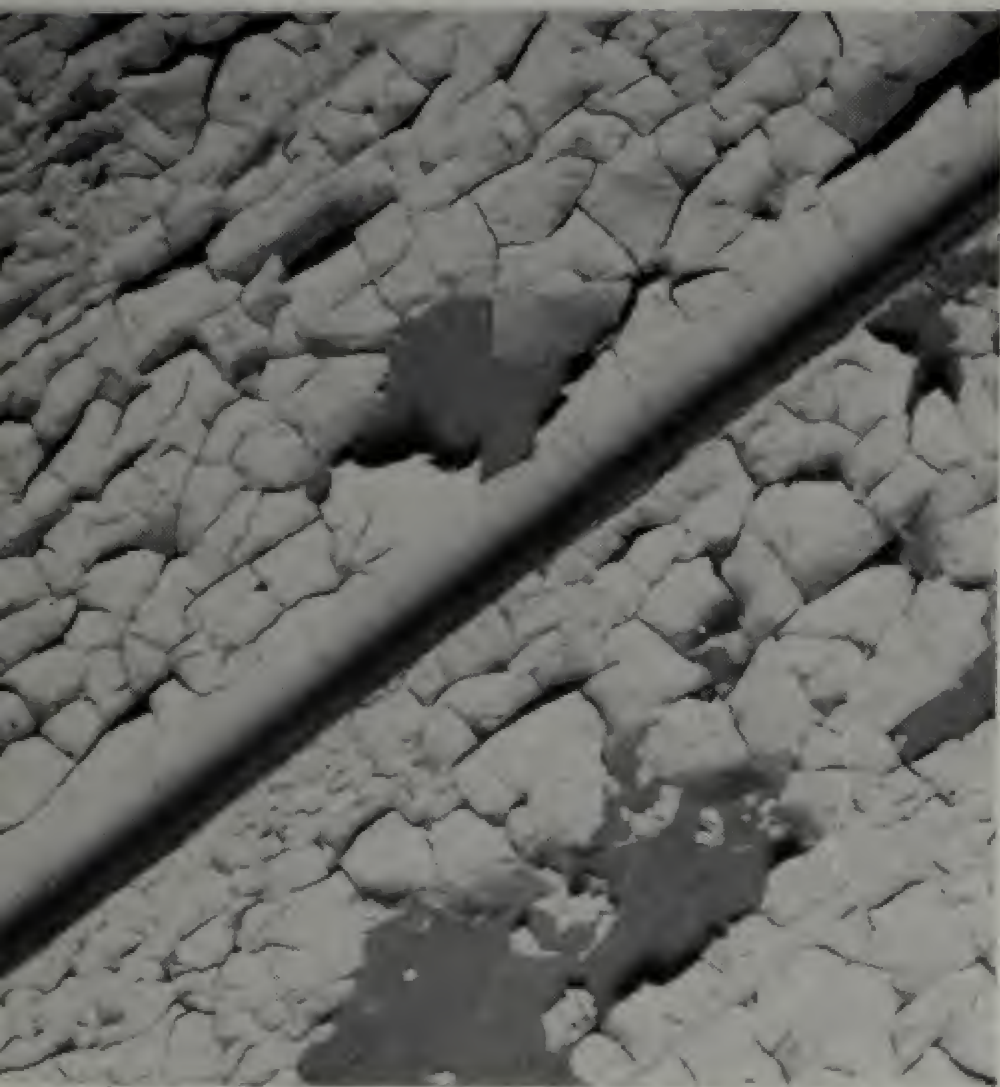


Fig. 4. O L. Moholy-Nagy, 1938
Linear mobility
Every drawing can be understood as a motion study since it is a path of motion recorded by graphic means



Fig. 5. Print of Kandinsky's right hand (enlarged), 1926
Demonstration of the organic quality found in the manifold lines of the palm and fingers

camouflaged to appear as if they had been constructed of stone or brick. The reverse may happen too. Under the pressure of new inventions old designs may experience a second youth, a kind of Indian summer. For example, since the invention of gas lighting, the old kerosene lamp has been efficiently redesigned. Instead of burning the oil-soaked wick, the new models now generate kerosene gas by pressure.

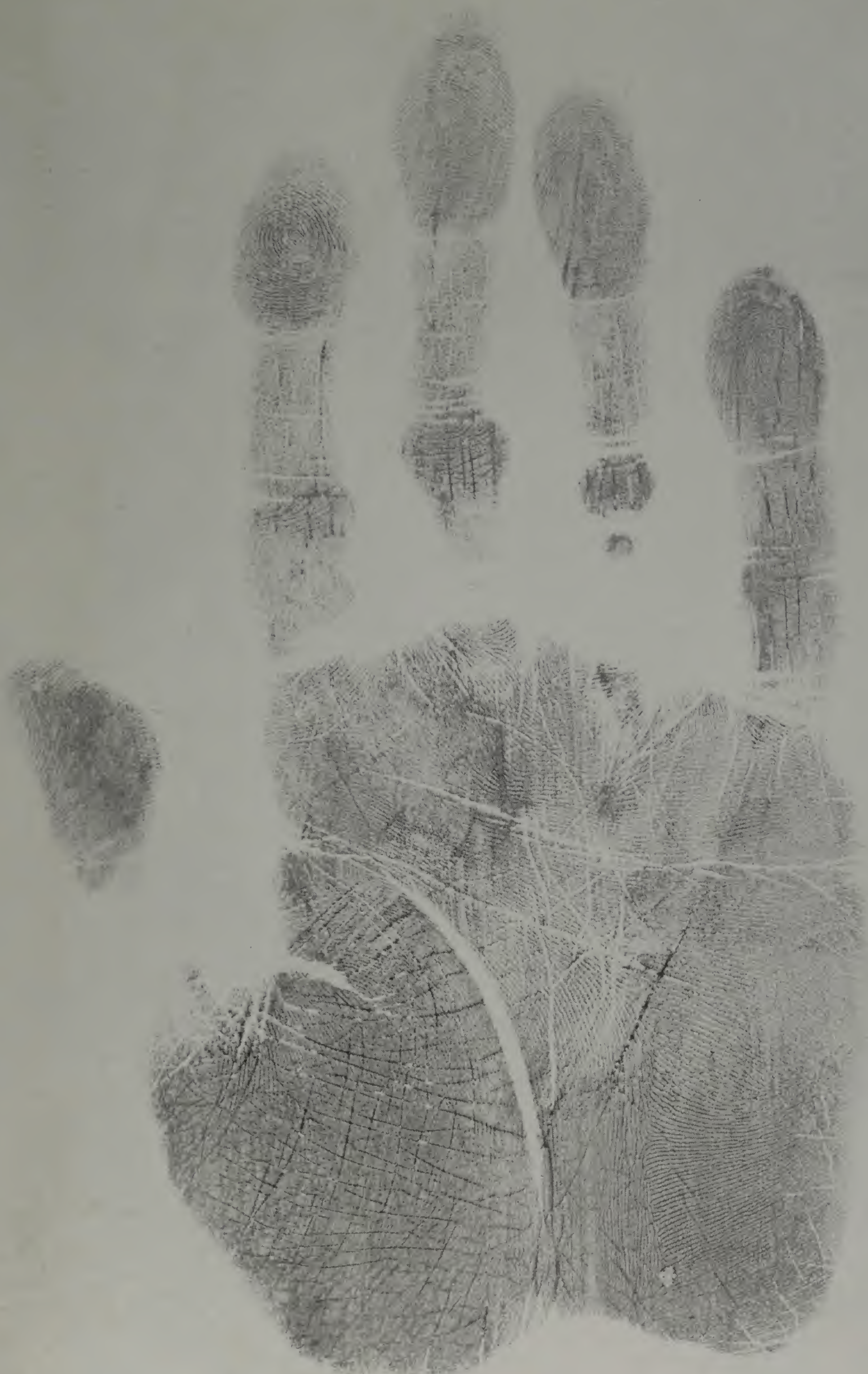
Every tool, every medium, every process, whether it is technological or organic, has its intrinsic quality which, to understand and employ, must be listed among the main duties of a designer.

●
The sea rolls against a sandy beach; the waves subtly corrugate the sand.
A painted wall cracks; the surface becomes a web of fine lines.
A car moves in the snow; the tires leave deep tracks.
Rope falls; it lies in smooth curves on the ground.
A board is cut; it shows the marks of the saw.

All these phenomena, caused by various processes, can be understood as diagrams in space representing forces acting upon the varied materials plus the resistance of the materials to the impact of these forces.● If the elements, the forces, and the processes involved enjoy an optimum coincidence, one may speak of *objective* quality. It should be understood however that "optimum" and "objective" never mean a rigid formula. Depending upon new discoveries, they have a potentiality of future improvement, meaning that a previous "optimum" may be superseded by another one. This book was partly written to prove this point in the fields of design, education and the arts. But the premise is valid for society itself as the all-embracing framework of human activities.

This assumption is valid for every form of expression, too. One may select, as an isolated case, a line drawing. The child's or grown-up's doodling, the master's perfect drawing—all have their specific character which we may call *subjective* quality. They all originate as a diagram of forces, through resistance of the material and tools (paper, pigment, brush, pencil, pen, etc.), to the pressure and motion of the hand of the draftsman. The smoother, the more controlled and natural the use of the ele-

● I find an almost identical statement in the book "Form in Growth," by Sir D'Arcy Wentworth Thompson (Cambridge University Press, 1942), page 16.
"In short, the form of an object is a 'diagram of forces,' in this sense at least, that from it we can judge or deduce the forces that are acting or have acted upon it: in this strict and particular sense, it is a diagram in the case of a solid, of the forces which have been impressed upon it when its conformation was produced."



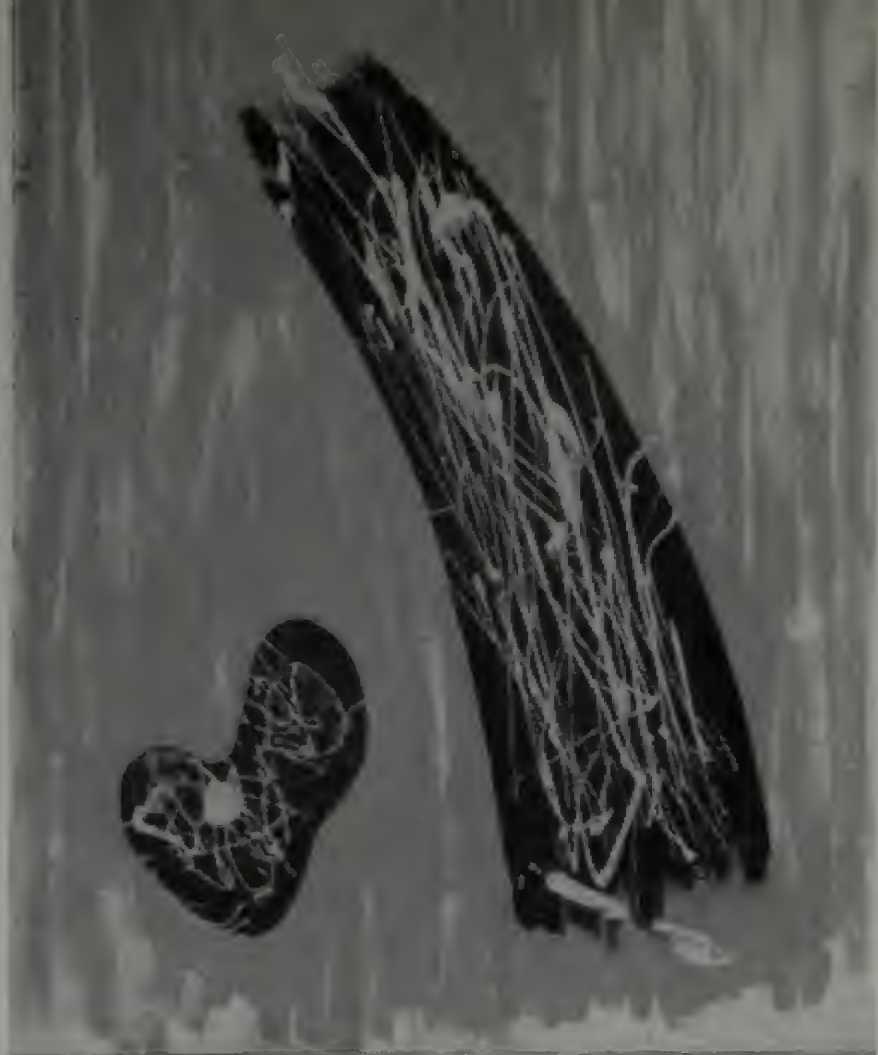


Fig. 6. O Howard Glazer, 1945

Texture study

An experiment with rubber cement. The cement is brushed over the surface, painted over it, then removed

Fig. 8. O Robert Santmyers, 1942

Analysis of a Picasso painting

The task was to translate the colors of the picture into black and white and gray a) with many gray values, b) only two grays to be used, and then try to express the picture in its essential line structure.

Connecting the extremities and other obvious points of interest, a prismatic line structure resulted showing the tightness and clarity of the composition. Thus, the "clarity of line" in its virtual superimposition over a painting can be included as a species among the many qualities of line



Fig. 7. O Elic Nekimkin, 1943

Texture experiment

A power carving tool produces a surprising "line quality" in the transparent plastic

Fig. 9. Lyonel Feininger, 1923

Wood cut

Here the quality of the line is derived from the cutting tool as it is applied against the hard surface of the wood

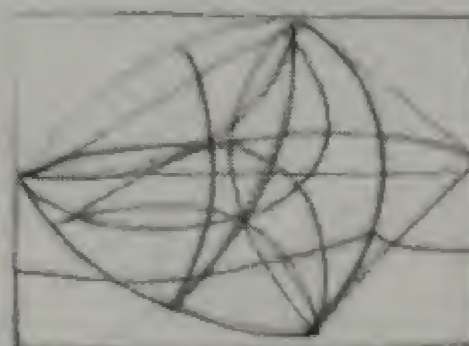
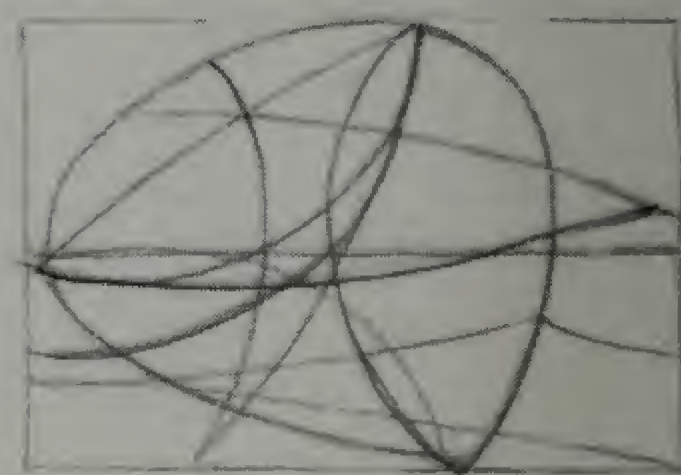
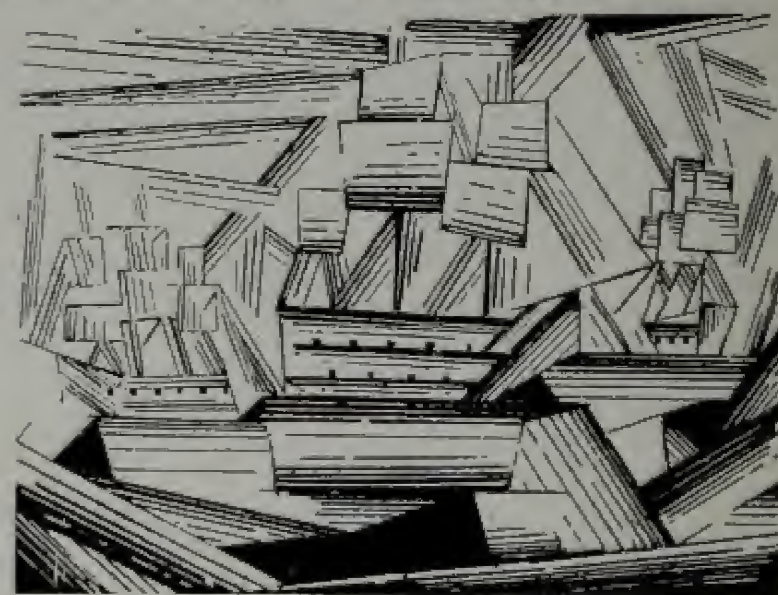




Fig. 10. Fernand Léger, 1930

Gloves

The quality of line is again different in pen drawings. There are many varieties dependent upon the point of the pen and the paper used



Fig. 11. Ralph Samuel, 1944
Aerial view
(see also Figs. 42 and 185)

Here are titles of a sequence of exercises
by Robert J. Wolff:

1. testing materials
2. search for the quality of line (signatures)
3. search for the quality of linear imagery
4. linear control
5. perception of proportion
6. search for spatial relationship—lines and dots
7. half tones
8. factors controlling spatial expression
 - a. clusters of lines
 - b. combination with photograph
9. the object observed and penetrated
10. reintegration of elements derived from the object
11. positive and negative form
12. synthesis

ments and their relationships is, the better the results will be. With the mastery of the materials, the move toward objective quality begins, where the results will be nearer to an optimum than to a blind play of chance. In order to reach an “objective” quality through an organic rightness of the forces applied, the craftsman has to master the elements of his work. These elements have a great diversity of application. Varied combinations modulate the results. The tools, pen or brush, india ink, water color, or tempera, paper or canvas; the forces employed, such as pressure of hand, jerky or smooth motions—all produce definite changes involving certain connotations. The artist may use the same materials for different results but instead of hand tools he may employ the machine, air brush, or spray gun.

The exploitation of such possibilities leads to the comprehension of the refined and sophisticated use of means, of traditional or revolutionary techniques and their intrinsic quality in any media, or in fact, in any human activity.

Fig. 12. O Florence Forst, 1945
Rendering a collage (pencil drawing)



quality of relationships

As long as we spoke about "quality of processes," such as the calligraphy in line drawings, we only analyzed the components of skill. If they are to produce coherence, a purposeful synthesis, they must become the construction elements of complex relationships. Such relationships produce a new quality which is "design."

designing is not a profession but an attitude

Design has many connotations. It is the organization of materials and processes in the most productive, economic way, in a harmonious balance of all elements necessary for a certain function. It is not a matter of façade, of mere external appearance; rather it is the essence of products and institutions, penetrating and comprehensive. Designing is a complex and intricate task. It is the integration of technological, social and economic requirements, biological necessities, and the psychophysical effects of materials, shape, color, volume, and space: thinking in relationships. The designer must see the periphery as well as the core, the immediate and the ultimate, at least in the biological sense. He must anchor his special job in the complex whole. The designer must be trained not only in the use of materials and various skills, but also in appreciation of organic functions and planning. He must know that design is indivisible, that the internal and external characteristics of a dish, a chair, a table, a machine, painting, sculpture are not to be separated. The idea of design and the profession of the designer has to be transformed from the notion of a specialist function into a generally valid attitude of resourcefulness and inventiveness which allows projects to be seen not in isolation but in relationship with the need of the individual and the community. One cannot simply lift out any subject matter from the complexity of life and try to handle it as an independent unit.

There is design in organization of emotional experiences, in family life, in labor relations, in city planning, in working together as civilized human beings. Ultimately all problems of design merge into one great problem: "design for life." In a healthy society this design for life will encourage every profession and vocation to play its part since the degree of relatedness in all their work gives to any civilization its quality. This implies that it is desirable that everyone should solve his special task with the wide scope of a true "designer," with the new urge to integrated relationships. It further implies that there is no hierarchy of the arts, painting, photography, music, poetry, sculpture, architecture, nor of any other fields such as industrial design. They are equally valid departures toward the fusion of function and content in "design."

design potentialities

Contemporary design began in this country fifty or sixty years ago with the statement of Adler and Louis Sullivan: "Form follows function." Function means the task an object is designed to fulfill, the task instrumental in shaping the form. Unfortunately, this principle was not appreciated at the time but through the endeavors of Frank Lloyd Wright and of the Bauhaus group and its many colleagues in Europe, the

Fig. 13. S. W. Hayter, 1945

Amazon (engraving)

Hayter tries to get the utmost from the engraving process, introducing almost photographic (photogram) qualities

Abstract surface divisions often are called "design" in this country. But such a decorative treatment is only the variation of ornament. About fifteen years ago the problem of ornament was an important issue. Today it is not even the subject of argument. The creative power which went into the production of ornament is transferred now into materials, tool-formed textures, and surface treatments. The genealogy of the ornament shows that originally, in pre-literary times, it stood for symbols, as we have them today in the red cross, five pointed star, stop signs, skull and cross bones for poison, wings for flyers. The difference is that the old signs had cultic connotations. When the original symbolic value of the ornament was lost, it became embellishment, making the ornamented object merely appear more precious. There was a time when such ornamentation became extremely rich and inventive, using mathematical and geometrical wit. Every historical period has had its own visual interpretation of these classical patterns though all their symbol-values have been forgotten, leaving only a hollow shell. The ornament was dead. But because of the hypnotic power of tradition, many could not break away from it. They started out with new ornament inventions, using indigenous floral motives; in the United States, Louis Sullivan; in Europe, the Jugend-Stil (style nouveau), and especially architects in small agricultural countries like Hungary. Frank Lloyd Wright found that the only appropriate thing to do in the "age of the machine" was to produce machine-made ornaments. Later under the influence of modern paintings, geometric ornament "inventions" were made. They were second-hand imitations, weak, without symbolic validity or visual wit. Then with the new ideas of an asymmetric balance and order, there came a new type of surface division under the guise



of "design." This was an abortive attempt to save ornament, symbolizing pseudoelegance and Victorian nostalgia. This type of "design," "abstract" or "naturalistic" became a disease in "modernistic" art education as well as in industrial production. It is sad that after reaching a certain standard for plain mass-produced objects, designers and manufacturers pour "design" over the goods to make them appear more costly. Such "design" is the basic cause of the bad taste seen in household objects, dresses, textiles, despite the lesson that our functional needs in combination with materials and tools can produce superb quality of shape and beautiful textures reaching from chromium-plated polished finishes to rough seersucker surfaces. Texture is, at least for our time, the legitimate successor of ornament.



Figs. 14-15. Fingers gripping, showing the function of pliers
An example of biotechnique

Fig. 16. Bombbay of a bomber
It resembles a giant, terrifying insect



idea of "functionalism" became the keynote of the twenties.* "Functionalism" soon became a cheap slogan, however, and its original meaning blurred. It is necessary to reexamine it in the light of present circumstances.

The statement "form follows function" is profound if we apply it to phenomena occurring in nature where "every process has its necessary form which always results in functional forms. They follow the law of the shortest distance between points; cooling occurs only on surfaces exposed to cooling; pressure only on points of pressure; tension on lines of tension; motion creates for itself forms of movement—for each energy there is a form of energy." (Raoul Francé)

Man has used the functional suggestions of nature innumerable times. Utensils, appliances, containers, tools are based upon his observation of nature. Nevertheless, "form follows function" translated into the human technology falls far short of the optimum which nature achieved in infinite applications, long tested by an evolutionary trial and error method. Man tries his "best," but his results depend upon his limited knowledge and practice, his ability to reason and feel. Though he had for ages designed utilitarian objects for "function" some of them were bulky, burdened with an excess of material and wasted labor if compared with later developments. It is enough to look at the difference between a log cabin and a colonial house; between a primitive lumber stool and a finely carved rococo chair. In all of them form did follow function, but the later models incorporated the technological processes meanwhile developed. In designing for human consumption, function is not only a demand for a limited mechanical task; "function" also includes the fulfillment of biological, psychophysical, and sociological requirements.

New discoveries, new theories, and the new methods in scientific research, brought new technological applications in all fields of production. Electricity, the gasoline and Diesel engines, the airplane, motion pictures, color photography, radio, metallurgy, chemurgy, new alloys, plastics, laminated materials, inevitably pressed toward change in design.

The history of the chair is a very revealing example. The functional justification of a chair is seating. Its form, however, depends upon materials, tools and skills. The old craftsman had only one material suitable for a chair—wood. With that and a few hand tools he did fine work. A Windsor chair made from thin dowels, a rococo stool with its carved, slender, curved legs, without elaborate bracing devices, were masterpieces of wood construction. They not only looked light but actually were light in weight. In addition to wood, the industrial revolution developed new materials, such as plywood, plastics, seamless steel tubing. These require new methods of production, machines instead of hand tools. The problem now is to use these materials and machines as capably as our precursors used the limited means and tools at their

* *Bauhaus* is a coined word. It means "building house," not only in a material but also in a philosophic sense. The Bauhaus was founded in 1919 by Walter Gropius in Weimar. Gropius, an architect of world fame, is at present Chairman of Architecture of the Graduate School of Design at Harvard University. (See also page 63.)

Fig. 17. Castle Bruehl (Germany), 1743
Wrought iron gate

Man took nature's example not only for his tools and constructions but for his ornaments and decorations as well. For instance, this gate imitates dry leaves



Fig. 18. Berenice Abbott
Skyscraper

Raul Francé states in his biotechnical studies that a skyscraper, if the same structural principles would be employed in its construction as they appear in the stalk of a plant, could be 700 stories high with the same material as used at present

Fig. 19. Rudge, 1884

Directly driven high bicycle

One of the most amazing vehicles man ever constructed is the bicycle. Without any predecessor, its design, pure and simple, shows an imaginative use of the elements not hampered by obsolete standards. The above machine is exceptionally light. It was used in racing





Fig. 20. O Charles Niedringhaus, 1939
Plywood armchair

This chair is one of the most ingenious chairs which Niedringhaus designed in the Institute of Design. It weighs only 10½ lbs. and the springiness of the seat is the result of the use of manifold plywood bending (covered by U.S. patent)



Fig. 21. Marcel Breuer, 1926

Springy armchair (constructed from seamless steel tubing)

The new material, steel, allowed this two-legged solution of a chair, making it particularly advantageous at places where, especially in a motor car, an extension is required for leg space for the sitter behind the front seat. This chair—in contrast to its imitations—avoids contact of the body with the metal by pulling back the bars at the shoulder and knee, as well as insulating the arms of the chair with wood. By making the chair's back from cloth or leather, the spine has a good support without pressure caused by the usual back made of hard material

Fig. 22. O Jack Waldheim, 1944

Springy armchair in laminated wood

An application of the tubular steel chair in wood. The Institute of Design made many experiments for furniture, especially chairs. It was found that no chair is satisfactory in which the position of the sitter is frozen. It is a human habit to change the position of the body after sitting for a while. Chairs in which such movements are made easy should be considered more advantageous. Such a chair is illustrated below, using the principle of the wood spring (invented at the school, see Figs. 67-69)



Fig. 23. O L. Moholy-Nagy, 1940

Compressed air holds up a chisel, dancing in the air

The shape of things is generally not the result of individual effort but a process of development in the fields of art, science and technology in a certain period for which the designer has an understanding. Thus functions can be solved in different periods with different means. Excellent wooden chairs have been made in previous periods with three and four legs. Today we can make chairs with two legs from tubular steel or plywood, and in the future we may be able to eliminate legs entirely and support the seat with compressed air

disposal. Today new chair forms can be produced, seats with two legs instead of the usual four, and with four joints or none at all in place of the customary forty or fifty. Tomorrow there may be just a seat on a compressed air jet.*

established paths of thought

It appears then that the best designer is the person who knows all contemporary resources and can understand their trend most completely. This goal does not seem to be very difficult to attain. One would think that the present scientific and technological information would speed the application of the potentialities at hand. This, however, turns out to be an illusion. It took a hundred years after plumbing was introduced in the kitchen to create the design of a water kettle that dared to exchange the small spout for a large one, which could be held directly under the faucet, filling the kettle without taking off the lid.

* Difficulties may arise as far as public acceptance of such revolutionary designs is concerned. The plywood chairs made in the Institute of Design, Chicago, looked so incredibly light that people at first hesitated to use them. A similar reaction retarded the general recognition of the first steel tube chair by Marcel Breuer; and when it was accepted, it was often misused. Steel is a heat conductor. Breuer considered this, and designed his chairs so that the human body did not touch the metal structure. The imitators, copying only the appearance, did not consider this important feature. I recall another incident. In 1916, the police in Rotterdam, Holland, ordered an architect to place two columns under his cantilevered balcony of reinforced concrete, even if he would only make them from cardboard, because "the projection may frighten the public."

The development of iron handles
The first is turned on the lathe in wood
and the two others made from molded
plastics



Figs. 24 a, b, c. Wood and plastic iron handles, 1941

Since the handle can be molded in plastics,
the designer can apply the functional
principle of hand fitting handles, instead
of imitating the old lathe-turned wooden
handle



The heat-insulated handle of a flatiron shows a similar lag in development. First the handle was covered with rags, then it was hand-carved from wood, then turned on the lathe. This handle was then literally translated into plastics. Only lately has it been redesigned in accordance with the properties and mass-production possibilities of the new material independent of lathe turning.

Figs. 25 a, b. Water kettles

It took 130 years after the introduction of plumbing before a waterkettle-spout was devised, large enough to be filled directly—from faucet to spout—instead of having to take off the lid



There are many old products which show the pure expression of handicraft processes. They are often imitated by the industrial designer though they have no legitimate existence today. The older the craft the more difficult it is to change its shapes. • Pottery is a good example. Square plates would be more practical than the round ones as they would have a wider front and could be stored more economically. But originally plates were made on the potter's wheel, so they kept their shapes as discs in spite of the new mass-production methods of casting and molding which allow free shaping. Related thinking will set off a chain of change in all other tableware, too. It is estimated that in the future every household may have a dishwashing machine (perhaps combined with the washing machine for laundry); thus well-designed tableware must reckon with these requirements and vice versa.

However, experiences show that it is rather difficult to leave the established path of thought, in spite of the fact that if functional, scientific and other necessary requirements were considered, mass production could bring to the fore better and cheaper products, more "beautiful" because of their "objective quality." But when the exceptional few with ingenuity and insight try to make a clean break, they are checked by a stubborn opposition.

•
With increased knowledge and new findings the industrial revolution today enters a new phase. The period of the old power machines in the form of glorified hand-tools is over. To the technology of the machine as multiplication of muscle power will

• *In a description of the Mellon Institute, Pittsburgh, Pa., the nationally famous research laboratory built in 1937, I find a classic example of this conservatism. The "Conception of the New Building," a brochure published by the Institute, is full of astonishing conclusions.*

"Although other types of architectures were considered, the preference from the outset was weighted heavily in favor of the Grecian school. The architecture of ancient Greece combines great beauty with the simplicity that is fitting to the home of science. And in the philosophy and the general intellectual curiosity of the Greeks of the golden age, modern science had its beginning. The architecture of the building, therefore, was to be a tangible recognition of the link between the science of early days and the science of the present and the future, exemplified in the Institute's purpose and work.

"The requirement of the Institute made necessary a building of about six and one-half million cubic feet. The architectural treatment dictated that the building be very wide in proportion to its height—the very opposite from the proportions of a skyscraper. In order to secure this low, horizontal appearance, and yet provide the required space, it was necessary to build three stories below ground level, the lowest floor resting on bedrock. These lower three stories contain nearly half the total cubage of the building.

"The first floor is almost three stories below ground level on the street side of the building, and about two stories on the other side. A pit, excavated in solid rock under the first floor level, provides a location for elevator machinery and other equipment, thus eliminating the necessity for machinery houses on the roof, which were prohibited because of the architecture of the building.

"The attic is used for ventilating equipment.

"The roof is of unusual design to preserve the architectural beauty of the building by concealing the outlets of flues and pipes essential in any laboratory structure."

Though "democracy" today is a highly misinterpreted and often misused term, I would like to reconsider it in its essential, original meaning, culminating in the philosophy of the best of the American revolutionaries, such as Jefferson, Paine and Whitman.

Then the emphasis of the designer on function and simplicity instead of on cultic symbols and decoration can be understood as one way of expressing the democratic spirit. The American Colonial furniture and other commodities, for example, can be understood as an opposition to feudal, ornate forms of living, symbolizing the oppression and exploitation left behind in Europe. It could be argued that the

real cause was an economic one, that is a lack of craftsmen and wealth rather than a protest. But the heavily ornamented, pompous churches, castles and palaces in Mexico and the South Americas of the same period prove the contrary. Also the functional furniture without ornamentation designed by the enlightened English gentleman himself at the end of the XVIIIth century, as well as the simple, functional style, the "biedermeier", of the "honest" burgher of the early XIXth century show that the revolutionary spirit of democracy had much to do with functional design. This spirit broke down in this country around 1893, with the Columbian Exposition, Chicago, about which Louis Sullivan remarked that it would ruin the architecture of the U.S.A. for fifty years. There the parvenu, the new money aristocracy of the world, had been triumphant. In order to be recognized in its new status of power and wealth, it imitated and even transported stone by stone, nail by nail, the ornate buildings, interiors, utensils and appliances of feudal Europe, decorated lavishly, symbolic of luxury and might. And the less rich began to ape the wealthy, and unscrupulous advertising completed this deterioration of taste and values.

At the same time, in Europe the opposite happened. The attempts of the "Jugendstil" (art nouveau), the rise of socialist doctrines and anti-authoritarian, republican tendencies supported a movement toward true, functional design. This had its climax in the years from 1920 to 1930. Then "functional" design began to be taken up in this country too, but as an advertising stunt, a kind of novelty rather than a sincere effort to create lasting social values. The moral force behind the original efforts quickly dissipated (perhaps it was never understood), and the designers feel themselves free today to mix the "new" with the old. The present policy of decoration and embellishment and other compromises of design signify most probably a re-emerging reactionary outlook since designing is not a profession but an attitude.

be added the technological substitute of the human senses through electronics. New forms for old needs and old functions will emerge through the new principles of production and supervision. Sawing may become electronic cutting by the heat of ultra short waves; weaving of textiles may become the casting of fabrics. Invention directed on principle rather than on "proven practice" can pave the way to better, more economical and more human solutions, not only of commodity problems, but of everything which makes life worth living. There are a few lesser instances to bring home the argument. The lawn mower, the electric razor, hot air towels (blower), air brush and spray gun, for instance, were not the results of refashioning of previous procedures but of rethinking of principles on the basis of new scientific and technological standards. The same fundamental approach must be applied to many more products. The engineer's hammer could be loaded with mercury to make its blow harder and the withdrawal lighter, or it could be redesigned to be driven by electric power as already is done with scissors.

In spite of all these potentialities, we never should lose sight of the human element, its proportions and biological rhythm as the most important measuring rod of evaluating technological advances and their inclusion into our lives.

forms and shapes

New principles applied in executing old functions produce new forms and shapes. They will not necessarily be "perfect." It sometimes takes centuries to produce a really satisfactory standard—satisfactory, that is, from all points of reference. Since at present revolutionary transitions are taking place, the formerly intuitive work of the designer is shifting toward a more conscious mastery of the elements of art, science, engineering, economics and market research. In spite of this, the work of the designer in some traditional field, such as home furnishings, for instance, has remained practically untouched by contemporary requirements. This fact demonstrates our involved system of economic supply and demand, as well as the advertising machinery which often victimizes the buying public. Let us again consider home furniture.

Since the Nineties the "cultural" tradition, the respectability, of wealthy families was expressed in "conspicuous waste" such as period furniture and light fixtures, the importations from European castles and monasteries completely torn from their context. Imitation of these originals promised profit. Mass production simulated the original pattern and high-pressure advertising and cheap prices produced a "trend," forcing the worthless imitations on the market. The result was not only a perpetuation of obsolete functional standards but also a relative price stagnation because the principles of mass production and subsequent price reduction could not be as successfully applied to period imitations as they could have been to designs employing the possibilities of new materials and new machines.



Fig. 26. ○ James Prestini, 1939

Wooden dishes (turned on the lathe)

These designs have eternal shapes; they are functional; simple without emphasizing individual whim; nevertheless through their rich use of wood grain and beautiful finish, they are most satisfactory

"Form" and "shape" were interchangeable terms in the past. "Form"—in today's terminology—is reserved for "the mode in which a thing exists or manifests itself" (Oxford Dictionary). Form is the unity of all elements which produce a synthesis in the different realms of expression, in painting, sculpture, architecture, drama, poetry, motion picture as well as in the technological sphere. "It has form" signifies coherence and structure of a genuine intrinsic arrangement which is defined by the spe-

cific way in which the elements were employed.

"Shape" generally defines either an elemental figure or a configuration as visually perceived without analyzing its component parts in a set order. Shapes can be classified as either geometrical or free. The fewer connotations and symbolic values they have, the more elemental they are and the more elementary they can be in their direct sensory impact.

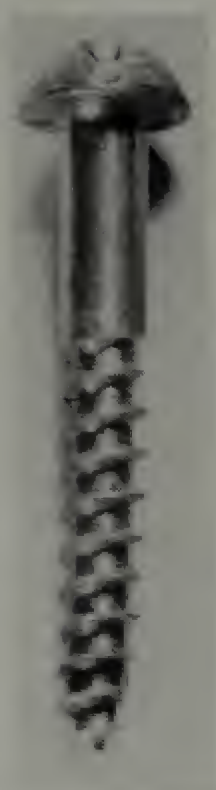


Fig. 27
The screw is the symbol of the first period of the industrial age. The assemblage of goods was accomplished then with the screw, the rivet and the bolt

the age of assemblage

The finest solutions of functional design usually are found in new inventions. Here no traditions or precedents hamper the freshness of approach, as shown in the steam engine, electric motor, telephone, radio, and photocell. These forms were developed through consideration of function plus the most advanced technological production process available.

The technology of the industrial revolution started out with the division of labor which led from simple assemblage set-ups to the conveyor belt and other mass-production practices.

For a rather long time the new idea of assemblage prevailed. This was the "stone" age of the bolt, the rivet and the screw which made possible a production of the most diversified goods from standard stock such as the various profiles, angle iron, steel band, brass plate, gauged sheet, rod, tube, screw, bolt, hinge, caster, etc. Materials and semi-finished products could be stored in great quantities. The production risk of ready-made goods was small since usually only as much was produced as the anticipated sale.

Fig 28. Timothy Hackworth, 1828

"Sans pareil" locomotive

This locomotive was designed for a competition in 1829 at Rainhill, England, for a prize of £500 offered by the Liverpool and Manchester Railway Company. The typical assemblage method of this early period of industrial production was riveting of semi-finished and stock material





Figs. 29 a, b, c. Boeing Aircraft Co., 1927-1940

Development of the airplane from assembled and riveted to welded stage. Probably the greatest single factor in the progress of aviation has been the study and application of welding. In the hands of aeronautical engineers and designers, welding has made planes possible which were undreamed of in safety, comfort, speed and range of operation.

Shown in the illustrations are three planes: 1927 Single-engine biplane accommodating two passengers and 500 pounds of mail. Gross weight 6,000 pounds, wing span 44 feet, maximum speed 129 miles per hour

1933 This model carried 10 passengers and baggage, had 2 pilots and a stewardess. Gross weight 13,100 pounds, wing span 74 feet, top speed 181 miles per hour

1940 The "Stratoliner" 33-passenger plane having a gross weight of 45,000 pounds, wing span 107 feet and top speed of 246 miles per hour. Flies at altitudes up to 20,000 feet

Greater strides have been made since, especially in military aviation during the second world war

Fig. 30. Plastic arch for footwear, 1939
Warping the flat sheet in all dimensions creates a structural unit of great strength



streamlining

Later, with the opening up of new markets, more goods were needed so more effective mass-production methods were introduced. Bolting, riveting and screwing were followed by welding, molding, shaping and stamping. Instead of the ribbands and the profiles there came the seamless tube and the corrugated and curved slabs. Curving of a flat sheet is a customary strengthening procedure; and curving it, like the eggshell, in all directions, is the most substantial structural manipulation we know. It achieves the advantage of a skeleton structure utilizing the skin alone.

Such designs were mainly developed by the motor car industry, especially due to the impetus of the kinetic studies and wind tunnel experiments which airplane research introduced. In automobile production the result of these and similar testing techniques was utilized on a large scale although tooling and retooling involved greater investments in dies and machinery. Yet because of the volume of sales, the expensive



Figs. 32 a, b. O Jack Waldheim, 1942
Man stands on four eggs

An experiment to determine crushing limit of eggshell. The eggs were covered with thin latex, their heights equalized with plaster shoes; top and bottom cushioned by thin rubber layers. This structure easily supported a man's weight. For a further experiment, one egg was removed and a weight of two-hundred and eighty pounds placed over the remaining three eggs without breaking them

Fig. 31. Jakob—Pilger—Shell, and its section

Corrugated sheets in metal, asbestos, plastics, etc., are the biotechnical adaptation of a natural shell, achieving through the corrugation a very substantial strength



preparations could easily be amortized. The smoothly "streamlined" body of a car is stamped today by one action from flat sheets of steel. It is a kind of "steel egg," structurally sound.

The results of these studies were also taken over by the designer of all other goods from lather and cream mixers to ships, locomotives and highways. Around 1930 a "streamlining fever" swept indiscriminately over every type of individual design. At first this appeared to be rather exaggerated because in nature, streamlining is employed only by moving forms, and streamlining implies rounded and tapered shapes which cut down external friction produced by motion. • Industrial streamlining was developed for an economical shaping of objects moving with great speed. There was,

• "No creature shows more perfect streamlining than a fur-seal swimming. Every curve is a continuous curve, the very ears and eyeslits and whiskers falling into the scheme, and the flippers folding close against the body." ("On Growth and Form," by Sir D'Arcy Wentworth Thompson, Cambridge University Press, 1942.)

Fig. 33. Thomas Yee, 1945

Horten Spheroid (oil refinery, Richfield)
The new oil tanks are welded in compound curvatures like an egg shell, achieving a great saving by employing thinner steel plates than the previous riveted containers



Fig. 36. ○ Ralph Rapson and David B. Runnells, 1942

Prefabricated kitchen and bathroom

In this country Buckminster-Fuller has been the pioneer for prefabricated Dymaxion units, house, bathrom, streamlined automobile. Meanwhile, the young generation of designers and architects added valuable suggestions to his basic ideas. The above mechanical unit is, for example, a part of a fabric house of which walls and roof can be made from impregnated fabrics—as an insulated tent

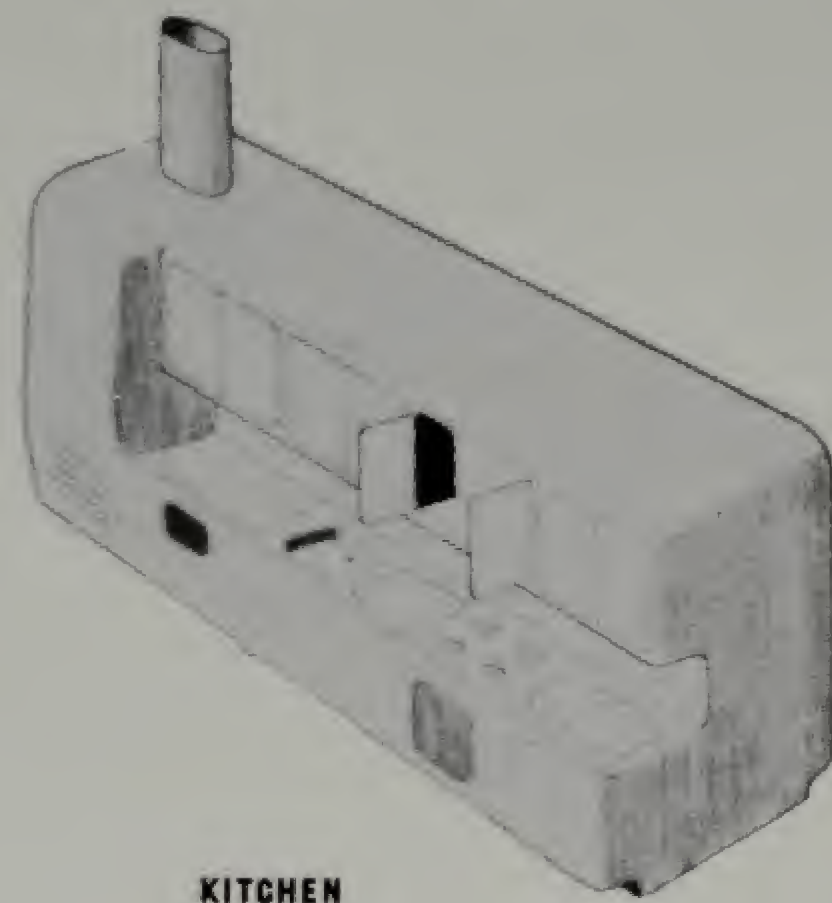
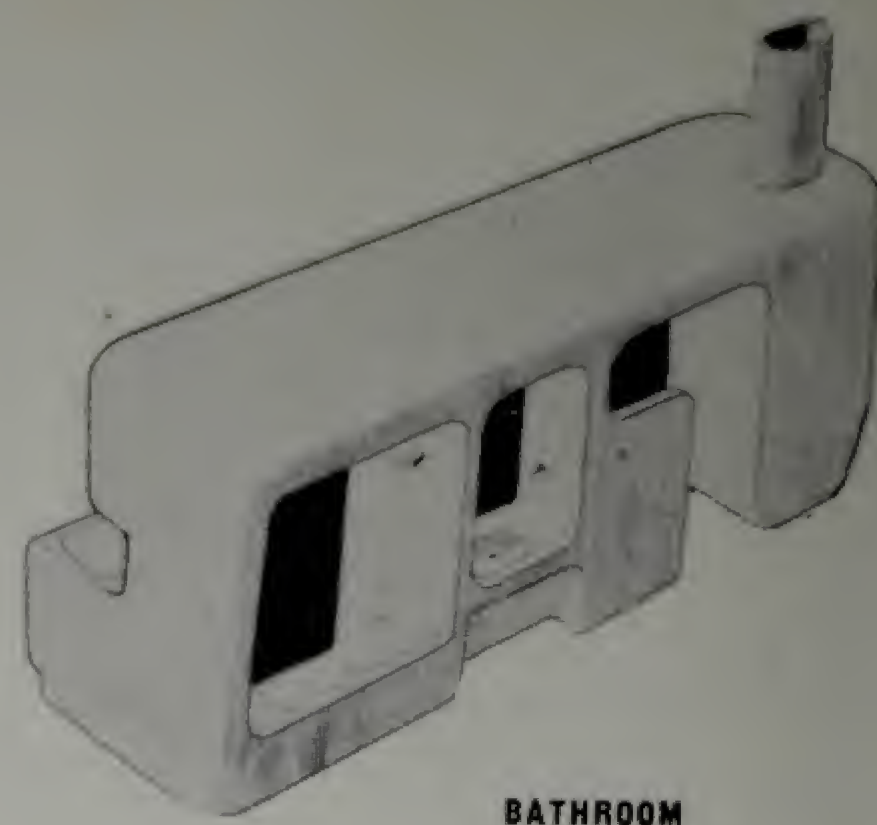
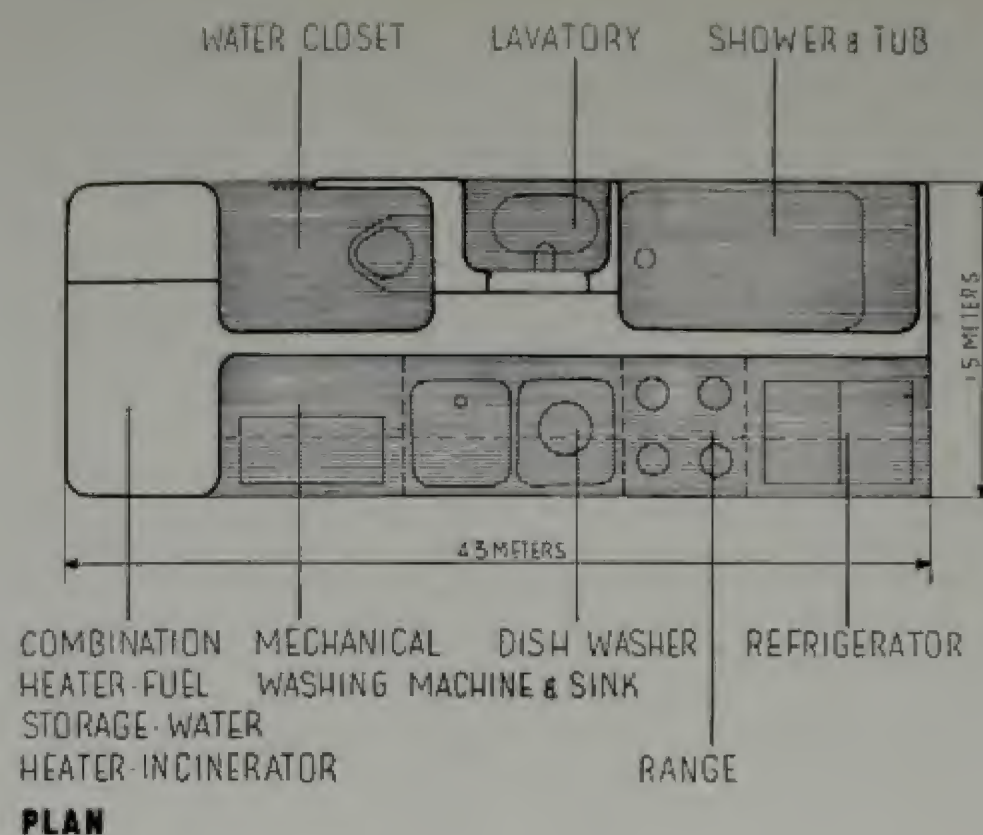


Fig. 34. Lather mixture machine, 1939
Except for the two decorative parallel lines which symbolize "streamlining", this little machine typifies a good application of the compression molding process in plastics



Fig. 35. Football helmet, 1939

Structural application of the eggshell principle. Though relatively thin, the helmet achieves great strength. For easier discrimination of the different playing groups, the inside of the helmet can be sprayed with color, with the double advantage of keeping the outside surface glossy and protecting the paint against abrasion



seemingly, no need for "streamlining" ashtrays, refrigerator door hinges, and other static objects. But this universal streamlining had a justification. In streamlining, sharp edges have to be smoothed down, consequently casts, molds, stampings as well as *finishes* such as nickel and chromeplating, polishing, enamelling and lacquering could be more easily produced. The fantastic growth of the American war industry was facilitated by the application of these principles. One of the greatest achievements was the application of mass-production methods to precision goods such as delicate instruments for flying, formerly produced by hand. This, however, does not justify thoughtless streamlining, poured—as the brown gravy in cheap restaurants—over every product.

new working conditions

The possible effects of the one shape production are far-reaching. This new principle of design, creating *objects in one piece*, mass-produced by the automatic action of the machine by means of pressing or molding, will one day greatly reduce the number of joints and perhaps eliminate the assembly line.* This would change the present working conditions in which fatigue of the worker, caused mainly by the restricted use of his manifold abilities, has to be considered as a serious psychophysical hazard.

* One could suggest the application of this principle for many fields such as furniture, molded without joints; for clothing, cast, pressed or molded in one piece instead of by cutting fabrics into many pieces in order to sew them into a single piece again.



Fig. 37. Libbey-Owens-Ford, 1943
"Kitchen of Tomorrow"

Placement of all working units at correct height eliminates stooping and bending, and allows the woman of the house to do three-fourths of her work while seated. This photograph shows the panels raised over the working units. At left is an oven with glass hood raised; next is a cooking unit with built-in waffle iron, cooking vessels and food mixer. Splash panel on sink has vitrolite glass backing and is self-illuminated when raised. At right is combination glass-enclosed refrigerator, serving bar and transparent glass china cabinet separating kitchen from dining alcove. Picture window "brings" nature into the room.

This kitchen can be converted into a playroom, a buffet bar or a study room for children after the housewife has finished the preparation of the meal.



Figs. 39 a, b. L. Moholy-Nagy, 1943
Sketch for a double-deck day and night car for the B & O Railroad Co.

By giving ample space to the day traveller, the seats and footrest allow room for stretching for a nap during night trips as well. Although a smaller part of the car is used for seating—a great part is given to the lounge, see picture below—with the double-deck arrangement more people can be accommodated than in the present type of car.

The lounge itself can be changed into two spacious washrooms—for men and women—by sliding walls of flexible woven metal.

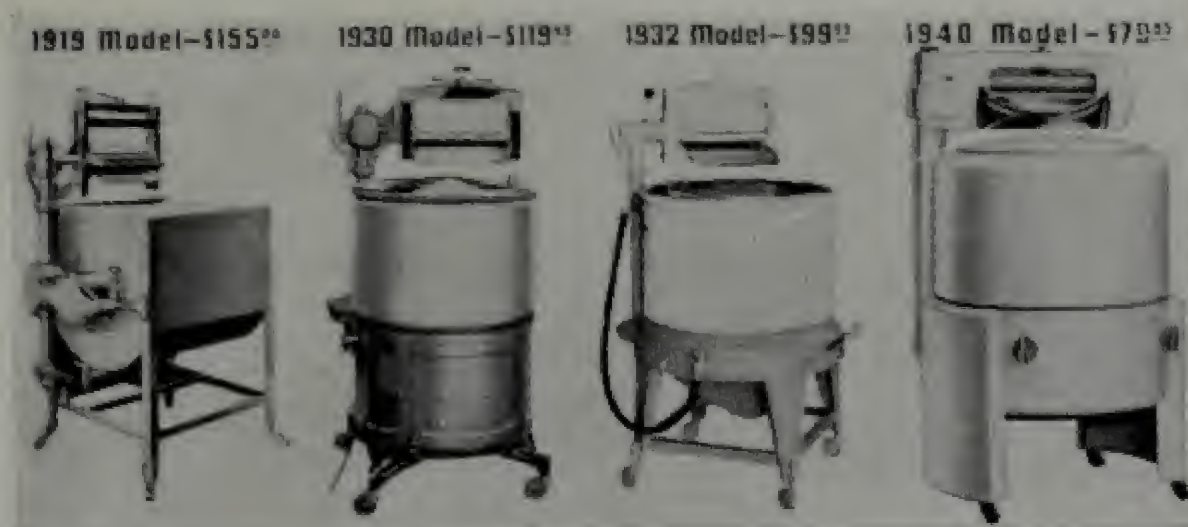


Fig. 38. The metamorphosis of the washing machine, from 1919 to 1940

The 1919 model was made from semi-finished parts riveted and screwed together. Subsequent models from 1920 to 1940 have been utilizing arc welding, casts, and stampings, since the enlarged volume of sales easily amortized the tools. (The 1940 model is by Henry Dreyfuss)

The serious social and biological consequences of an unhealthy division of labor in industry could act as an incentive to the designer. He should see that it is essential to incorporate into his work *more* than skill and knowledge; that to be a designer means not only to sensibly manipulate techniques and analyze production processes, but also to accept the concomitant social obligations. He should make his design with the aim of eliminating fatigue from the worker's life. He must see his design through, not only in the technical but in its human effects as well. Thus quality of design is dependent not alone on function, science, and technological processes, but also upon social consciousness.

other social implications

The relationship of employer and employee, unemployment, the requirements of minimum subsistence, longevity, and dozens of other matters, have changed the outlook on the social structure and, with that change, the approach to design. Higher living standards and the emancipation of women necessitated labor-saving devices, refrigerators, vacuum cleaners, and washing machines. Research on matters of health, prompted by the changing social pattern of large urban populations, preceded the popularization of hygienic technics, and, as a matter of course, created the bathroom as a standard unit. The intensity and the exhausting effect of industrial work, the crowded, dusty, smoke-polluted cities increased the importance of slum clearance, the prefabricated house, recreation and leisure—all connected with a socially oriented design. Sports, cinema, radio, television, travel, the community center, and the idea of week-end trips belong to this category.

economy of production

Of course, many elements have to be added to this analysis in order to see all the components of a "functional" design. One of the most important among them is distribution. On an unprecedented scale, mass distribution caused changes in sales organization and a vast increase in service industries. It swelled the means of transportation by steam and motor, ships, railway, bus, truck and airplane. It created the packaging industry, knockdown furniture, tank cars and refrigerators for perishable goods, frozen foods, canning, advertising, mail order houses, catalogs, sales agents.

This new mass-production economy brought in its wake great problems. Although capitalism is working with such slogans as "free enterprise," "supply and demand," the vast investments tied up in its mass production machinery and the unrestrained

competition of the world market, have resulted in sharper, more aggressive planning than is usually admitted. Market research with complex statistical data on calculation, production and sales, as well as competitive buying and selling have become the indispensable tool of every enterprise.

When production goes into millions of units, the saving of even a fraction of a penny in material or manipulation makes a substantial difference in the final financial balance. In one instance, cutting down fourteen drops of soldering to thirteen is said to have resulted in a yearly saving of \$30,000 and of large quantities of material. There are other savings from "recoveries" such as silver from photographic developer formerly poured down the drain, grease from kitchen fats for glycerine, sawdust for plastics, garbage for rayon, and others. All this stimulated economy of organization, simplification of processes, elimination of waste; it has brought improved methods of packaging, more efficient safety measures; and it even has produced new forms of rehabilitation for handicapped workers. Notable achievements in this field of planned industrial economy were the scientific motion studies by Taylor and Gilbreth. They were clearly manifest in production results.

The coming of an "electronic age" brings the stringencies of the profit system into even greater conflict with the potentialities such an age has for a richer sociobiological economy. Increased production with greater mechanization of processes will have as an inevitable consequence the reduction of man power and labor hours.

Apart from the dilemma of technological unemployment (which involves political problems not relevant here), this development will require a new coordination of leisure time with the recreational needs of the individual. The need for this coordination makes more pertinent than ever the social obligations of the designer as a designer.

the role of intuition

Possibly there is a recipe for a forecast of new trends in design. By being informed about scientific discoveries, including the psychological and sociological, a thorough knowledge of techniques can be applied to the realization of every design. This would seem to imply that products made on the basis of these requirements could not fall short of perfection. The truth is that in spite of the best use of these elements there remain imponderables which cannot be easily defined.

After the execution of a design, we may rationalize many of these imponderables, since some of them may be traced back to facts which are the subject of conscious argument. The real difficulty arises *before* the design is made, before the execution takes place. Practice proves that there is always a possibility of alternative design solutions with greater or lesser "objective" quality. Certain structural tasks could be solved in one or in another material or in several ways with one material. If a reinforced concrete column for a building would be structurally as satisfactory with either a circular or a hexagonal, pentagonal or square section, which should be chosen? Should there be fluorescent or incandescent light; china dishes or glassware; fenestra-



Fig. 40. Parker Pen Company, 1941
Fountain pen "51"

This pen with its enclosed mechanism is one of the most successful and harmonious designs of small utilitarian objects

tion with horizontal or vertical division; spiral stairways or straight ones; tubular steel chairs with two or four legs; low wing or high wing airplanes?

Among the multitude of scientific and technological alternatives, the answer, concerning these trends as well as the matter of basic visual and plastic shapes, and their essential psychophysical role, mainly comes from intuition. The choice is not based upon considerations of the single element per se but upon the relationships with the whole life. It is better the more it is expressive of the time and the more it preconceives the tendencies of future developments. The artist as well as the product designer accomplish this by knowledge and imagination, insight and intuition, reasoning and sensitivity. Among these qualities the most important is the ability to visualize the wholeness of the task in its corporeal solution before it is executed so that it can be evaluated with lightning speed. Such a visualization will direct the designer to use or discard ingredients according to the required function in its sociological and biological usefulness. The vividness of this inner visualization is a measure of the designer's ingenuity. Intuitive assurances often are infinitely better expressed by him directly in the work than in verbalization. The intuitive process has a speed and certainty which the conscious cannot match. The conscious is more closely bound to the verbal and thus linked to the word-structure of traditional reasoning. Conscious insight tends to be hampered by the verbal limitation, tends to be too conformist to the syllogistic world of cause and effect. The intuitive is the fluid world of all the senses whose movements throw up ever new forms and meanings.

Good design contains an unconscious prognosis of future tendencies because it is based upon the atmospheric conditions created by the manifold cultural and social requirements of a certain period which already carries the germ of the future. While such components can be easily recognized in the performance of the past, it is exceedingly difficult to find all the clues to the contemporary scene, the elements of which are in a fluid state and hence cannot be seen in retrospect. But many discoveries and new forms of the industrial revolution were preconceived by the artist and consequently accepted by the public because of *his* esthetic interpretation. One of the reasons for his more direct and lasting influence is that his language filters directly through the channels of emotion without the need for preliminary conscious and rational analysis. This ability of the artist is not mystical. His creative genealogy can be traced in every period.*

At its start the new technology was the domain of the specialists, mainly of the

* In 1870 Edouard Manet, the head of the impressionists, offered to paint frescoes in the City Hall of Paris depicting the "beauty" of railway stations and market halls of the French metropolis. The official opinion of that time saw in such technological matter only an esthetic nuisance. Manet's offer was not accepted. Even fifteen years later the same public opinion ("the official taste," as S. Giedion calls it) fought against the Eiffel Tower as a shameful blotch on Paris. Fifty more years, and the constructivists discovered the beauty not only of the Eiffel Tower but also of the machine and translated its exactness, precision, and planned performance into their own imagery, their own visual language.

engineers. The academic requirements of higher education, the humanities and liberal arts had not been adapted to the industrial development. The new generation had to be conditioned to the machine, to the significant new shapes, the uses and potentialities of the new age; for purely practical reasons, the machine had to be accepted as part of a new life. Its general economic and social potentialities, its universal ramifications, had to be understood together with its rapidly changing ideological basis from "free enterprise" to planned economy. Few realized that there was a dire need for finding adequate means of training the people to master this new situation. Fortunately, it is an unexpected quality of the modern art movement that some of its facets possess hidden relationships pertinent to "practical" life. (In fact, one could say that all creative work today is part of a gigantic, indirect training program to remodel through vision in motion the modes of perception and feeling and to prepare for new qualities of living.)

Around 1920 the new artists discovered the esthetics inherent in the work of the engineer. They looked with naive enthusiasm at bridges, oil and radio towers, tunnels, spiral stairways and all types of machinery.[•] It was the first time that they were able to see the form-creative, emotional qualities of technical structures, considered previously as only the carriers of engineering and production requirements. These new explorations of the artists introduced a period of simplification first into the works of art, then into all types of designed goods. This was the time of purification; stripping of decoration, deornamentation of appliances, furniture and architecture. Then followed the stripping of ornament from traditional thought categories.

The impressionists and cubists discovered the genuine sensuous and emotional quality of textures, brought about by an ingenious combination of tools, machines and materials which took the place of the ornament. The painters began their studies with a kind of premonition of badly needed industrial textures. Today, mass-produced goods from plastics, as well as other materials, are in need of genuine, functional textures, mainly as a protection against corrosion and abrasion. But before such functionally employed textures can acquire deep esthetic meanings, an habituation, a familiarity, in their application must be established. There are many elements to be investigated, such as the difference between organic and mechanical textures, chemical reactions and their relationships and possible combinations. There are other elements, too, such as transparency, employed for goods as well as architecture. Transparency first appeared in x-ray photos, photographic superimposition and paintings. These examples stimulated practical application like the use of transparent furniture, glass table tops, plexiglas legs and steel tube constructions, eliminating congestion in small rooms.

In the last thirty or forty years the problem of *positive* and *negative* has received a great deal of attention. Positive and negative are contrasts such as complementary

[•] *The dadaists, especially the painters, Francis Picabia and Marcel Duchamp, emphasized the beauty of "ready made" objects such as a clothing rack and toilet bowl in the days of 1916, when it was considered debasing to an artist to concern himself with such trivialities.*

Fig. 41. ○ L. Moholy-Nagy, 1940
Cellulose acetate packaging
Through the transparent cone within the
larger container, an easy dispensation of
the pills is possible



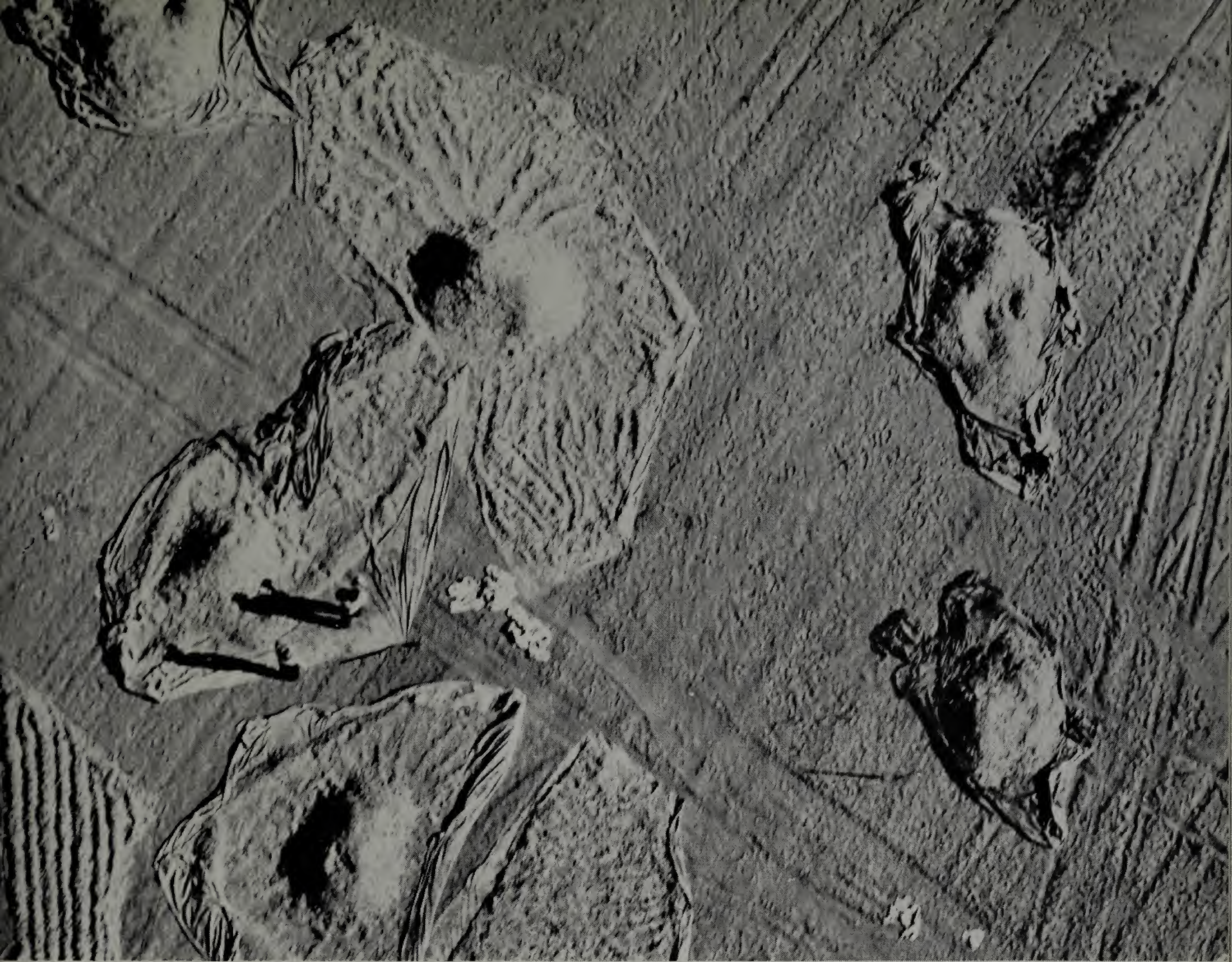


Fig. 42. Ralph Samuel, 1944

Aerial view

An amazing beauty of line and texture quality is formed through the low sun, bringing into sharp relief the "stuff lying on the ground" and the tarpaulin covered "gismo"

colors, black-white, horizontal-vertical, hot-cold, fluid-solid, opaque-transparent. Since the earliest times they have been fundamental elements of creative expression, one or the other polarity preferred in the different periods. In old paintings the application of positive-negative values was not the focus of interest. The renaissance painters were



Fig. 43. O Kenneth Evertsen, 1941

Tea table with plastic legs

The free-form table allows a better placing of people around the table and the transparent legs will create a feeling of less congestion, even in a small room. The legs are sturdy and through their oblique position they are structurally satisfactory so that no apron around the legs is necessary



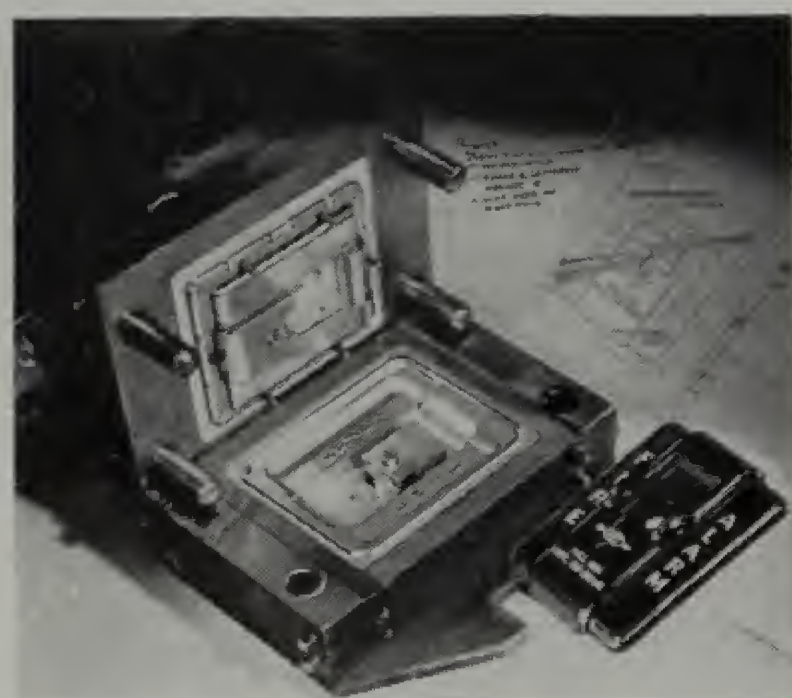
Fig. 44. Paul Cézanne, 1900
Still life (watercolor)

This picture shows the powerful interrelation of the positive and negative aspects, the full and the empty. This method of balance became most influential in the work of the cubists and the constructivists

Fig. 45. General Electric, Plastic Division, 1944

Steel die for plastic molding

The positive and negative dies show not only practical but also esthetic interrelations. The study of the negative volume in sculpture (Fig. 299) can be understood as an intuitive preparation to the mastery of this important element of industrial mass production

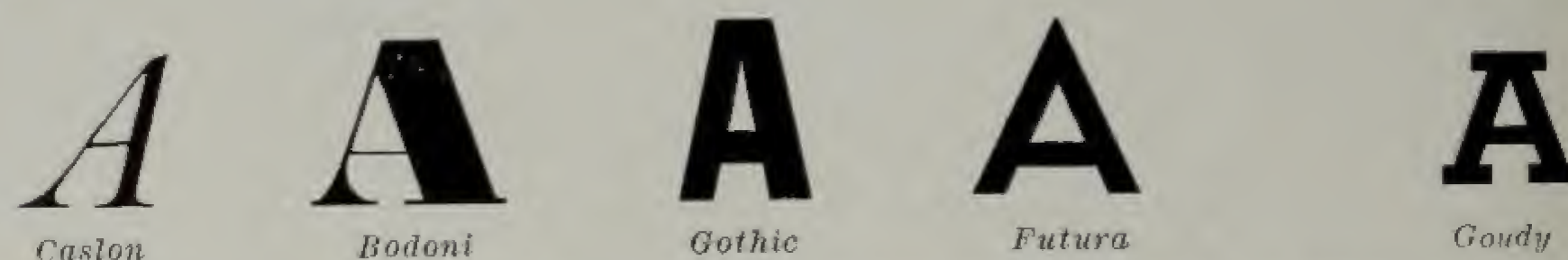


fascinated with the illusionistic rendering of objects which they placed into the illusionistic "space" of the painted surface. The canvas, every square inch filled, showed a definite rhythm through the relationship of these objects and their disposition. This meant, mainly, the consideration of the positive aspect. Rembrandt's light-dark contrasts touched somewhat upon a closer visual relationship of the positive and negative, but Cézanne was the first who really reevaluated the full and the empty parts of the canvas. In the paintings he left "unfinished" he introduced a new pictorial structure through the equal value of the areas painted and those left empty.*

Something similar can be found in the consciously sketchy paintings by Matisse and the seemingly uncompleted canvases of Picasso. In these works a new structural spirit can be recognized. In the previous paintings where every square inch was filled, the "objet d'art" was a closed, independent, static unit. The new approach constituted more marked relationships between parts of the whole; it discovered a new dynamic in the interrelation of the full (positive) and the empty (negative). It created a new type of articulation of the picture plane, activating the spatial tension by receding and advancing values of these contrasts. This principle was consciously employed in the cubist collages, Picasso's and Braque's pluralistic heads, and later by Malevich, Mondrian, and the constructivist painters. The problem received an even sharper profiling when the positive and the negative became elements of interchangeability as in photographs (especially at solarization) and in sculptures. A popular way to explain positive and negative is to show a sculpture and its mold—the mold being the negative and the sculpture the positive. And yet in a certain light the negative mold may look like a positive. Archipenko extensively experimented with interchangeable elements of the positive and negative in his sculptures. His investigation must be carried further because besides its significance in art it holds great potentialities for industrial design and production, especially in casting, pressing, and molding of goods in glass, plastics, light metals, and steel. In these processes the knowledge of positive and negative is exceedingly important. Design for streamlined products and their economical execution cannot be accomplished without understanding the nature of this problem.**

• The unfinished portrait of George Washington seen everywhere in the country is impressive for another reason. There the blank part of the canvas, which Stuart had no time "to fill," accidentally concentrates one's attention upon Washington's features.

•• The letter-type "Egyptian," known as the army lettering of Napoleon I, shows a good application of this principle. In comparison to excellent but older types such as the Didot, Walbaum, Bodoni, the Egyptian is completely balanced in the positive as well as in its negative aspects, which helps to make it more easily read from great distances.



The contemporary versions such as Stymie, Memphis, Weltantiqua, etc., under the influence of the Futura, simplified the "Egyptian" equalizing with width of the bars.

Long before such problems had been consciously posed by industry, the artist had already been working on them with a prophetic vision. His work subconsciously preconditioned the public into a quicker acceptance of the necessary transition.

the avant-garde

Under the pressure of new needs, open-minded, resolute individuals emerged with fervent hopes for a better social order and for which they were ready to fight and sacrifice. Under the impact of violent changes, artists, writers, scientists and philosophers became the revolutionaries of a realistic Utopia awakened from the mere enjoyment of their crafts to essential duties and responsibilities toward the community. They went on to reformulate their aims and clarify their positions, so that new tools of intellectual and emotional inquiry could be created—a new mechanics of scientific and artistic research for social ends. From the encyclopedists and Voltaire and Rousseau, the way led to Fourier, Proudhon, Marx, Bakunin, Kropotkin, Lenin; from Pascal to Faraday, Maxwell, Pasteur, Rutherford and Einstein; from Lamarck to Darwin, Mendel, Pavlov; from Lavater to Freud; from Beethoven to Debussy, Schoenberg, Stravinsky, Bartok, Varese; from Poe to Petofi, Heine, Thoreau, Whitman, Rimbaud, Dostoievsky, Tolstoy, Joyce; from Sullivan to Wright, Loos, Le Corbusier, Gropius; from Courbet to Manet, Cézanne, Seurat, Kandinsky, Picasso, Léger, Malevich, Mondrian. These are the names that signify the effort and the results of an indefatigable spirit of investigation.

dissemination of knowledge

The work of these men brought new knowledge and shaped a constructive attitude for a new life structure. The next step was to disseminate this knowledge and put it to use. Education seemed to be one of the best vehicles. But strictly vocational education turned to the quick breeding of specialists with a rather narrow horizon. The need was for an education with a broader scope, fortified with the synthetizing ability of the artist who expresses ideologies visually or by other means of sensory transfer. Naturally, in order to express ideologies as emotional content, the artist must be imbued with the spirit of his epoch. But usually the artist is not conscious of the necessity or expediency of this intuitive performance. His synthetizing power has always been an automatic sequel to his work, the connotations ranging from recording to imagination of events. For centuries the painter had the realm of documentation; it was his task to record passing phenomena, persons, incidents, objects, landscapes. But when the devices of a mechanical memory such as photography seized upon the formerly primary task of recording, when documentation was taken over by the photographic apparatus with an unprecedented precision, a radically new orientation became necessary. This brought a revision of the artist's tasks. He had to find ways of adjusting the mechanics of creative impulses as well as the forms of expression to the present technology.

If one looks at the work of the best representatives of these new artists, one finds in

them the embodiment of a splendid knowledge of their material and a profound will to spread a new sense of discrimination and balance. At the moment, there are only a few and they are often misunderstood. Being attacked, they are often compelled to take refuge in "catacombs" in order to preserve their pioneer efforts, share faith with and serve as audience for each other.

In the transition from the handicrafts to industrial production it was not possible to have "experts" for mass production as such experts did not exist. Thus adapting men to the machine and its processes did not come without waste and great detours. America, the richest country on earth, could afford such a procedure. Mass production today has developed so far, however, that the hit or miss policy can no longer be afforded. A thorough and appropriate education of the worker is needed for every part of the mass production process and in all fields of industry. Men and women must have a broad basic training which does not destroy their aliveness and creative capacity by a too quick canalization of their abilities in one special direction. After this, a special education may then be desirable.

Fig. 46. Bernard Rudofsky, 1943
Sandal

In the field of clothing many healthy ideas can be adapted if the designer has an inclination to physiological solutions rather than to possessiveness and sex emphasis. Rudofsky installed a fashion exhibition in the Museum of Modern Art, New York, 1945, stating this problem and revealing the obsolete mechanics of the past and present clothing

mental adjustment

There has to come a mental adjustment of the people toward this changed world and its avant-garde. An understanding of the economic and spiritual advantages of that new world will be the best incentive for a changed attitude. The universal acceptance of the new trends in life as well as in design may take time, as people without clear orientation often become confused by either sentiment-appeal or "novelty" propaganda. The sentimental appeal operates with obsolete emotional clichés as nostalgia for the "good old days." A promotion of novelty for the sake of novelty on the other hand tends to create the illusion of new organic demands where no need exists. Usually it is nothing but an artificial stimulation of business. Such stunts can bring only commercial success as they depend upon the elusiveness of fashion which merely simulates organic development.* One remedy for such a distortion is the re-education of a new generation of producers, consumers, and designers, by going back to the fundamentals and building up from there a new knowledge of the sociobiological implications of design. The new generation which has gone through such an education will be invulnerable against the temptations of fads, the easy way out of economic and social responsibilities. The principles of such an education can be established only by the deliberate concentration of the most effective disciplines and techniques tested by conscientious research.

* *On the other hand, in women's clothing, where "fashionability" reigns, a certain more fundamental function persists. That is the very obvious blending of the functional need with the shifting erotic ideal that arises out of group life. Fashion here, though tinted as always with superficial and transitory affectations, helps form and express the sexual norm at any given period. The work of a good fashion designer shows elements of inventiveness in this respect by communicating subtle sexual reference through the sensuous value of visual material, texture, and shape. This again influences other actions and activities in society.*



III

new education—organic approach

a) general outline

In the book "Bauhaus 1919-1928" By Ise and Walter Gropius and Herbert Bayer (published by the Museum of Modern Art), Alfred H. Barr, Jr. comments as follows:

"Why is the Bauhaus so important?"

1. *Because it courageously accepted the machine as an instrument worthy of the artist.*
2. *Because it faced the problem of good design for mass production.*
3. *Because it brought together on its faculty more artists of distinguished talent than has any other art school of our time.*
4. *Because it bridged the gap between the artist and the industrial system.*
5. *Because it broke down the hierarchy which had divided the "fine" from the "applied arts."*
6. *Because it differentiated between what can be taught (technique) and what cannot (creative invention).*
7. *Because its building at Dessau was architecturally the most important structure of the 1920's.*
8. *Because after much trial and error*

the background—the bauhaus

The Institute of Design, Chicago, is a laboratory for a new education. Founded for the training of artists, industrial designers, architects, photographers and teachers, it embodies the principles and educational methods of the Bauhaus modified in accordance with the circumstances and demands of this country.

The old Bauhaus, an art university, established the principle that mass production of goods and modern architecture needed not only engineers but also artists with fresh mentality and exact information about old and new materials. The Bauhaus held that this information has to be coupled with a thorough knowledge of the means of expression as well as with the principles and practices of industry; that machines can be legitimate "tools" of the artist and designer. These were basic premises which had to be understood in order to give an industrial product a maximum of function and efficiency.

At the time the Bauhaus was founded the term "industrial designer" did not exist and the profession had not yet crystallized. The profession gained its status through the work of the Bauhaus. But beyond the newly won designation, function and scope of the designer-specialist, other goals were developed. It became evident that not the specialist, but the man in toto, in all his vitality and potentiality, must become the measure of all educational approaches.

it developed a new modern kind of beauty.

9. And, finally, because its influence has spread throughout the world and is especially strong in England and the United States."

Many books, periodicals and articles have been published on the Bauhaus. The most important are:

Staatliches Bauhaus Weimar, 1919-1923 (Bauhaus verlag 1923).

The fourteen Bauhaus Bücher edited by Walter Gropius and L. Moholy-Nagy (1924-28).

1. *Internationale Architektur*, by W. Gropius
2. *Paedagogisches Skizzenbuch*, by Paul Klee (translated into English, "Pedagogical Sketchbook," published by Nierendorf, N. Y. C.)
3. *Ein Versuchshaus des Bauhauses*
4. *Die Bühne in Bauhaus*
5. *Die Grundbegriffe der bildenden Kunst*, by Theo van Doesburg
6. *Neue Gestaltung*, by Piet Mondrian (translated into English "Plastic Art and Pure Plastic Art," published by Wittenborn & Co., N. Y. C.)
7. *Neue Arbeiten der Bauhaus Werkstätten*
8. *Malerie, Fotografie, Film*, by L. Moholy-Nagy
9. *Punkt und, Linie zu Fläche*, by W. Kandinsky
10. *Holländische Architektur*, by J. J. P. Oud
11. *Die Gegenstandlose Welt*, by K. Malevich
12. *Die Bauhausbauten in Dessau*, by W. Gropius
13. *Kubismus*, by Albert Gleizes
14. *Von Material zu Architektur*, by L. Moholy-Nagy (translated into English, "the new vision," published by Wittenborn & Co., N. Y. C.)

Walter Gropius: "The New Architecture and the Bauhaus" (published by the Museum of Modern Art, N. Y. C. 1938)

Siegfried Giedion: "Space, Time and Architecture" (Harvard University Press 1941, with a chapter on the Bauhaus)

Gyorgy Kepes: "Language of Vision" (published by Paul Theobald, Chicago 1944)

The Institute of Design, Chicago, building on these foundations, tries to stimulate the student's energies in their totality. The curriculum relies strongly on creative potentiality. The main intention is to produce an adequate rhythm between the biological capacities of the student and the contemporary scene. The goal is no longer to re-create the classical craftsman, artist and artisan, with the aim of fitting him into the industrial age. By now technology has become as much a part of life as metabolism. The task therefore is to educate the contemporary man as an *integrator*, the new *designer* able to re-evaluate human needs warped by machine civilization. The healthy function of a man's body, his social performance and welfare, his nutrition, clothing and housing needs, his intellectual pursuits and emotional requirements, his recreation and leisure, should be the center of endeavors. An education which is responsible for such a totality must be indivisible, integrating elements of art, science, and technology. Such an indivisible education may then produce the genius for the social and biological mastery of our age.

Although the vocational goal is kept in mind in its technological training, the Institute of Design emphasizes the growth of the individual within the group. Hence art, natural and social sciences, "Intellectual Integration," are fixtures in its curriculum. • Such an integrated training aims at more than the education of "free" artists in the old sense. The students must learn—besides the esthetic means of expression—the technology of materials, and they must experience the organic, evolutionary use of the material. They are trained to articulate all media after they have been given the knowledge of relationships out of which the substance of expression takes shape. They have to face practical design problems too, to satisfy given needs with given means in order to earn a living. If, through stimulation by all of the practical and spiritual material offered during their training, some of them choose the career of a "free artist," the choice is their own prerogative and responsibility though certainly the Institute's delight.

the foundation (basic) course

The first year Basic Course is the backbone of the educational program. It radiates its principles far into the curriculum of the later specialized vocational fields, design and architecture. The Basic Course consists of three great chapters of information and experimental work in constant correlation:

1. Technology

Basic elements of workshop training

- a. The use of hand tools and machines
- b. Materials. An understanding of the physical properties of structural materials, such as wood, clay, plastics, metal, paper, and glass
- c. Study of shapes, surfaces, and textures
- d. Study of volume, space, and motion. A training in the fundamental elements of design

• *Integration, in this book, means the correlation of subject matters on the basis of a common methodology governing our life, and not a new philosophical system compiled or "integrated" from the numerous other philosophical systems.*

When the Institute of Design was founded, music was one of the required classes—as essential as the other arts for a basic training. Here is the report of the teacher, David Dushkin, (1938): “The course is designed to promote the understanding and enjoyment of music by a three-fold participation: first, through musical crafts; second, through playing, and third, through analytic listening.

In order to make the first type of participation possible, a study is made in the workshop, of the tonal characteristics of common materials such as various types of wood and metal, etc., with the attempt to adapt them to musical uses by giving them definite pitch and providing resonance. In addition to these more common materials, others such as reeds, strings, tubes and skins are studied from the same point of view. A specific way in which these studies are realized, for example, is the formation of a diatonic scale of one octave, using any one of the tonal media mentioned above or others.

Problems involving a more developed study of instrumental design and the acoustical and musical properties of the more developed instruments have not yet been entered into, since a proper understanding of these involves considerably more background and time for investigation and analysis. It is possible that some students more interested in this phase of music can make further studies.

Second, the students have been loaned instruments, either which utilized knowledge previously acquired—for example, piano, violins, cellos—or instruments that could be mastered under the time limitations imposed by their other activities—for example, recorders and straight flutes.

In the analytic phase, the basic materials of music (rhythm, melody, scale and tonal characteristics, harmony and form) are discussed and illustrated. The emphasis here is analysis through hearing rather than through purely mental concepts. Hence, the ability to recognize rhythmic patterns, melodic and tonal characteristics and the elements of form and harmony should be the ability to recognize them when sounded rather than when seen on paper.

Almost everyone in the school is at present playing some kind of musical in-

2. Art

Basic elements of plastic representation

- a. Life drawing
- b. Color work
- c. Photography
- d. Mechanical drawing
- e. Lettering
- f. Modeling
- g. Literature (Group Poetry)

3. Science

To provide the necessary basis for the Institute's courses, enough mathematics, physics, and social sciences, as well as liberal arts, are taught.

Through these integrated studies the student is given assistance in developing latent aptitudes, so that his eventual decision and choice of specialization is based upon his own educational experience. “Specialization” means here the choice of a workshop, not a vocational goal. Since the industrial designer must be versatile, he must be trained in the most diverse fields. This, however, without the mastery of—at least—one field, easily could encourage dilettantism.

policy

The policy is, first, not to dominate the student; second, to provide him with the opportunity to become conscious of the world and himself through exercises which simultaneously train the intellectual and emotional spheres. The exercises are generally of such nature that he cannot look for solutions in books or in museums. Because these exercises have no direct counterpart in tradition but are built around his potentialities and tools and materials, they direct his vision to new and unexplored channels. The student must use his imagination and wit, he must debate and contemplate, he must make independent findings. Since he is not allowed to imitate past solutions, he soon finds the power to face new situations fearlessly, to develop new habits of imagination. This relieves him of the necessity of identifying or even comparing his work with past performances. This policy is a powerful incentive for the teacher too, as it lessens the danger of clinging to traditional fixations or to academic certitudes.

Occasionally the contemporary artist's intuitive research can be applied, in a simplified version, to educational exercises in order to build up in the student a new concept of living and working through analogous experimentation. The tactile (touch) exercises in the Institute are, for example, derived from cubism and futurism, teaching that rich emotional values can be released on a sensory level otherwise neglected, namely, touch. Cubist and Schwitters' collages have been the godfathers of the texture exercises in drawing, color work and photography; the constructivists opened up a large experimental area for mobile sculpture, for *virtual* volume, and for fundamental tasks in light and space articulation. The principles of Mondrian, Malevich, and others could be adapted for camouflage; the stone carvings and plaster casts of Arp, Moore and Hepworth for the free-shaped hand sculptures; Bruguere's paper

strument, the more advanced meeting together for orchestra playing while the less advanced play only in sections of their particular instrument and join the orchestra when ready.

In the study of the nature of music itself, also, it should be possible for students with a richer background and with exceptional musical energy to take more advanced work. A number of requests have already been made for opportunities of this kind."

After Dushkin left, John Cage took up the teaching of music which then became an elective subject. The group formed by him excelled in improvisations with self made percussion instruments.

Meanwhile, music had to be dropped from the curriculum (mainly for economic reasons) except for casual lectures and concerts.

photos for light modulators. Naturally, the student cannot be transformed into an "artist" with such "exercises," but they can open for him the doors of expression and condition him to a new vision. Such exercises are especially useful in the first year courses where the student step by step comes to understand the methodology of creative approach. At the same time, skills are acquired automatically, for in these exercises the idea of "skills" is taken as a matter of course. The attitude of the school encourages experimentation. The student works with different techniques and "learns" skills. He never has the feeling of forced learning since skills are needed as matter of course for the solution of the tasks for which his interest has been awakened. Stimulated by the unusual or unknown, he is anxious to perform adequately. He looks for the best possible solution. He collects the necessary data and material; he reasons about the components of his "design"; he investigates different techniques—past and present—for its realization. Since it can be executed only with "skills," he turns his energies toward their mastery. Without being made conscious of the fact that his efforts at execution are an integral part of the learning process, he "learns" to handle tools and machines, materials and their technology.

the educational technique

There are a number of points which deserve consideration.

Among the exercises, one of the most important is the reexamination of tools and materials so that a given work can be executed in terms of their basic qualities and characteristics. One could call this approach an artless, unprejudiced search which, first on a modest but later on a growing scale, conditions one to creative thinking and acting, to inventiveness and intuitive assurance of judgment. This idea has an affinity with the kindergarten play technique as well as with the apprentice education of the old craftsman. There is, however, a great difference in orientation. The "play" of the grownup, while it offers opportunity for relaxed explorations and collection of data, has implicitly a constructive direction. Through the collaboration of teachers who have the power of discrimination, the significant points are quickly recognized in the experiments and through subtle leadership the "play" is brought to purposeful results. An education in the crafts develops responsibility toward the product as a whole and through this it teaches the student discipline. But the crafts are not emphasized in opposition to machine work. The machine is understood as a very efficient "tool" which—if properly used—will serve the creative intention as well as the traditional handtool.

A second principle is to break down complex tasks into fundamental components so that they can be digested one after the other and then brought into functional relationship. The requirement is, however, that even such elementary exercises, though they may combine only a few elements, must achieve entity, "form," must produce a coherent whole.

In all exercises a certain rhythm is introduced through an alternating pattern of freedom and restriction. First, expression is encouraged with the greatest range of



Fig. 48. O Institute of Design

Hand sculptures

Like pebbles on the beach, showing infinite varieties, hand sculptures are similarly agreeable to the eyes and hands in their flowing contours and pleasing shapes

Fig. 47. O Dorothy Riley, 1940
Tactile chart in the shape of a drum



emotional interpretation without any censorship. For example, a tactile chart, an illuminating, enriching exercise for the fingers, can be composed solely with the power of intuition. But after that, a photographically precise rendering of the chart, its facsimile, has to be made. This requires minute observation, a coordination of the eye and hand. With this combination of approaches swift emotional decisions are brought into an organic relationship with the relatively slower process of the critical mind.

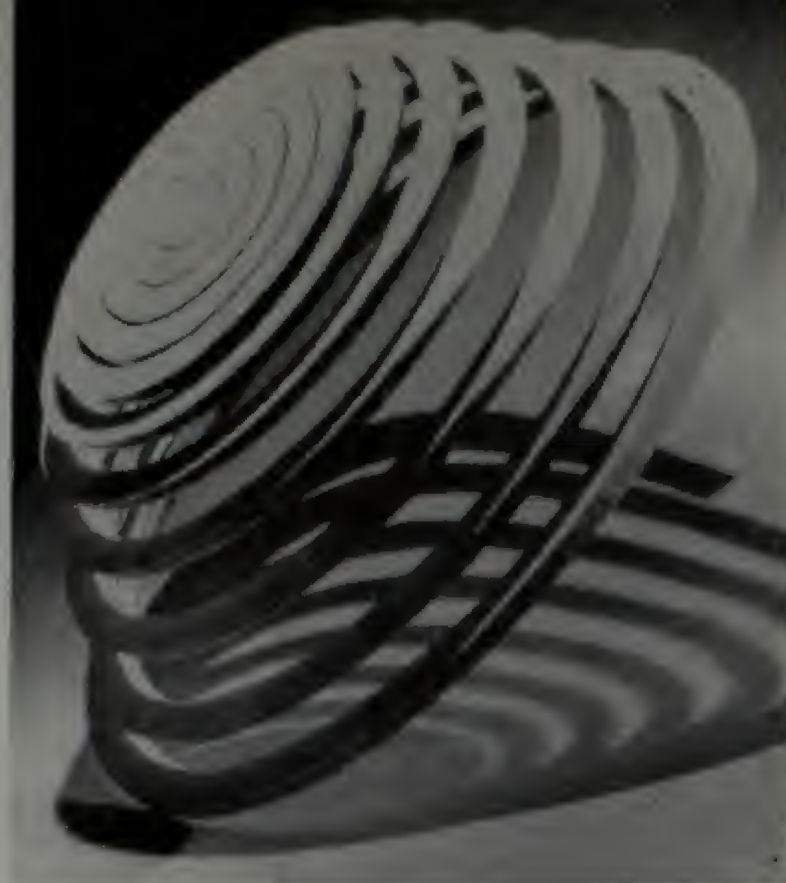


Fig. 49. ○ T. Torre Bueno, 1940
Woodcut



Fig. 50. ○ Institute of Design, 1939
Papercuts and metal light shields by ○
Crombie Taylor showing application of
such exercises to industrial products

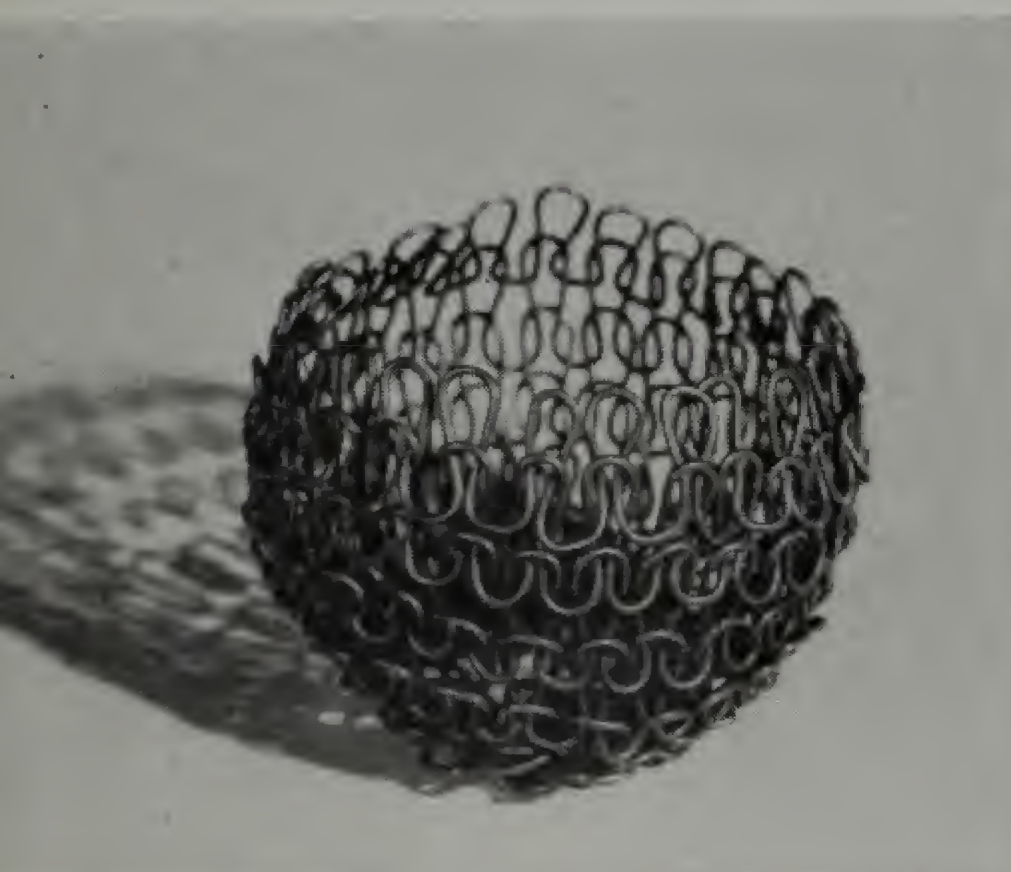


Fig. 51. ○ Stanley Kazdailis, 1943
Wire structure



Fig. 52. ○ Nick Savage, 1943
Ink drawing
(See Figs. 301 a, b, c)

practising correlations

A number of exercises which confront the student are aimed toward self-discovery; that is, the awakening of his own creative abilities. The exercises are mostly built upon sensory experiences through work with various materials, with their technology, the skill of the fingers, the hands, the eye and the ear, and their coordination. This is accomplished through tactile charts composed of textures and hand-sculptures carved out of wood, which are to be handled and felt; through machine-wood-cuts which make lumber as elastic as rubber; through folding, rolling, cutting and other manipulations of flat paper sheets which lead to the understanding of basic three-dimensional structures; through plane, volume and space division and their further articulation. In addition there is work with sheet metal and wire, glass, mirrors, plastics, drawing and color, mechanical drawing, photography, group poetry, and music—a full range of potentialities.

These subjects, organized in the first year curriculum, become correlated through a method of simultaneous handling of the same problem in the various workshops, classrooms, and studios, emphasizing the mutual influence of technique and materials. For example, when a sculpture is made in the modeling workshop, the same sculpture is used in the photo studio to serve as a study for light and shape definition. Again the same sculpture is utilized as a departure for volume and space analysis in mechanical drafting, as a theme in drawing and color exercises, and the same object will also be analyzed in the science and technology classes. Since in such an approach many different angles must be considered, the student gains a comprehensive understanding of the single object. He learns that this method can be utilized for various subject matters, giving him the courage to attack other problems without inhibition and fear and with a sharpened sense of logical and emotional interpretation.

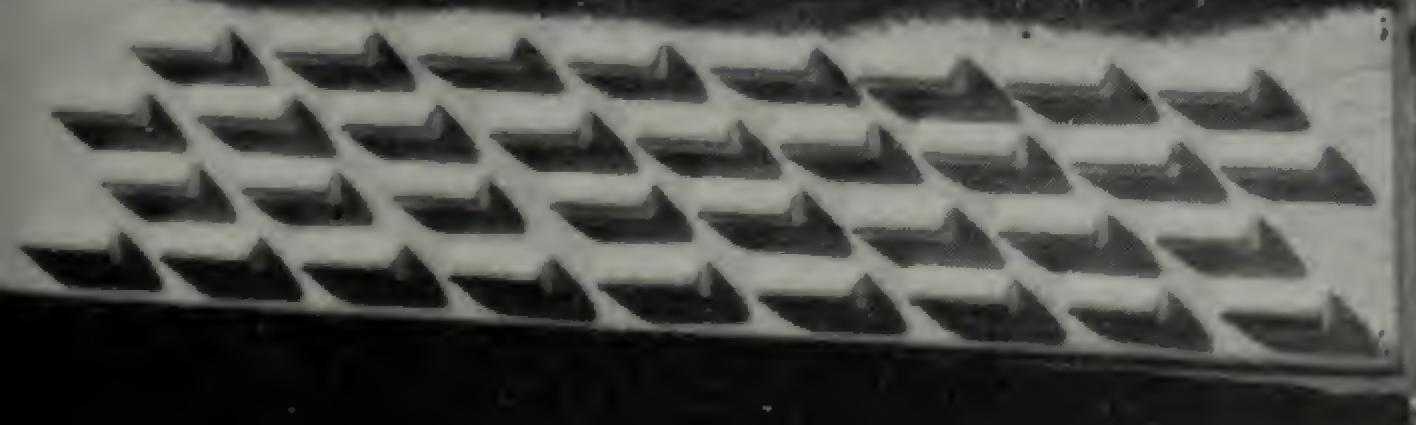
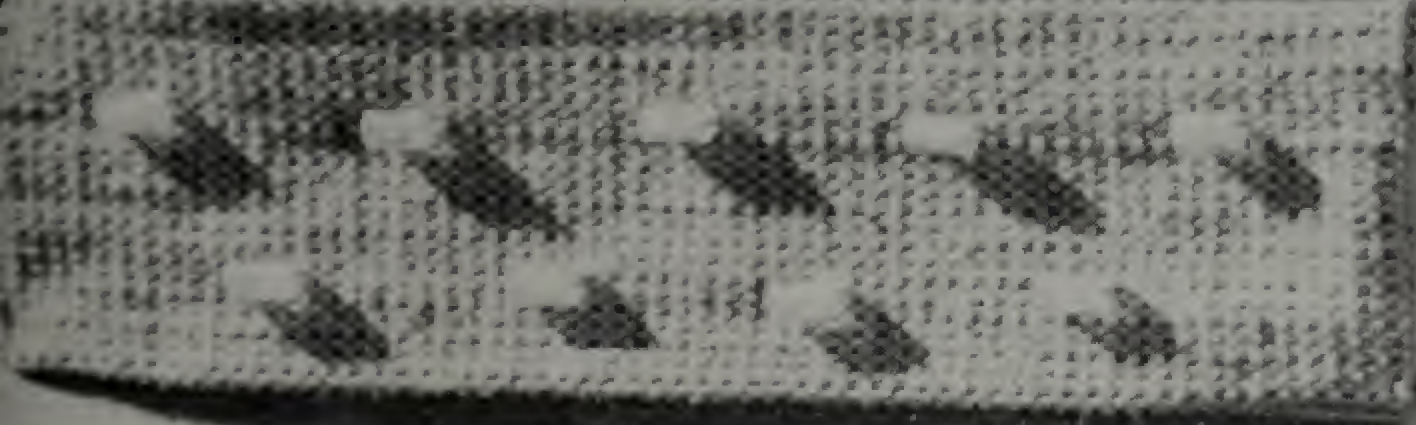
Summing it up: the training is directed toward imagination, phantasy and inventiveness, a basic conditioning to the ever changing industrial scene, to the technology-in-flux. This works "forward" as well as "backward"; that is, concerning future developments or old-fashioned tasks.

The last step in this technique is the emphasis on integration through a conscious search for relationships—artistic, scientific, technical as well as social. The intuitive working mechanics of the genius gives a clue to this process. The unique ability of the genius can be approximated by everyone if only its essential feature be apprehended: the flashlike act of connecting elements not obviously belonging together. Their constructive relationships, unnoticed before, produce the new result.

If the same methodology were used generally in all fields we would have *the* key to our age—*seeing everything in relationship*.

Fig. 53. ○ Richard Filipovski and Patricia Parker, 1944
Tactile chart

A dictionary of the different qualities of touch sensations, such as pain, pricking, temperature, vibration, etc



scientific curiosity

An educational approach based upon workshop experience is the best stimulus for intellectual curiosity and individual findings. The more surprising the findings, the more intense will be the student's urge to analyze their nature. Then after a while when he is on the way to form his own technique of research, he becomes aware of his need for more skill and more information. Instead of having to be urged to learn, he himself demands more scientific instruction because through it he receives answers to the growing number of his questions. The task of a good teacher is to let this interest then flow into organized channels of scientific inquiry and laboratory experimentation. This will provide a sure ground for scientific education of the student as well as for the theoretical structure of engineering which may later receive more prominence in his specialized work.

The scientific and humanistic studies are arranged so that within eight semesters the student participates in general courses given by experts in biology, sociology, economics, anthropology, general semantics, history, literature, art history and intellectual integration. The last is a course which Charles Morris created for the Institute.

Mathematics and physics are given for the beginning classes as cultural subjects; later, with increased mastery of the fundamentals, these subjects are taught more thoroughly and understood as tools of the designer and the architect.

There again without any outside pressure, the student realizes the purposeful interrelation of all these subjects with his "design" problems. If he then encounters cases which require special information, he finds the details without difficulty, because the integrated education has provided him with the basic tools of research, a technique of inquiry in the logical as well as in the subliminal (subconscious) fields.*

common denominator

Implicit in this approach is a cultural task. The student is imbued with the artistically neglected substance of the machine age, mass production, materials, techniques, structures and shapes which conditions him to all forms of contemporary art, so that he cannot fail to incorporate this new world into his art and design. He is taught to revolve his design problems around the social complexes and the needs of man.

Such an education—the integration of art, science and technology—leads the student

If progressive education is to be successful it has to coordinate the student's verbal performance with his means of expression, such as painting, sculpture, poetry, play and music. In other words, the capacities of the student must be utilized also on the technological and artistic plane beyond verbalization, that is, his potential expression by means other than the word.

* In addition to the regular curriculum a "galaxy" of lecturers were presented to the students. Among them: Walter Gropius, Alvar Aalto, Jose Louis Sert, Henry Russel Hitchcock, Beaumont Newhall, Richard Neutra, Sigfried Giedion, James Johnson Sweeney, Fernand Léger, Man Ray, Ernest Krenek, David Dushkin, W. W. Wurster, Serge Chermayeff, Daniel C. Rich, Margaret and Ralph Gerard, Louis Wirth, Maynard Krueger, Franz Alexander, Carl Eckart, Louis Gottshalk, Lloyd Warner, Rudolph Carnap, S. T. Hayakawa, Sibyl Shearer, Margit Varro, Hi Simons, Felix Witzinger, Egbert Jacobson, Thomas French, L. L. Thurstone, Alexander Dorner, J. G. Crowther, H. S. Ede, S. D. Peech, Conrad Sommer, Horace Cayton, E. W. Robertson, Aaron Sayvetz, John U. Nef, L. L. Lewis, O. Phelps, Jack Copeland, Christian Ruckmick, Russel W. Ballard, Vincent O'Brien, C. J. Bulliet, Howard Fisher, Konrad Wachsmann, Herbert Read, Szymon and Helena Syrkus, etc.

to a simultaneous acuity of experiences, verbal and nonverbal expressions. It stabilizes his virtues, sublimates his faults or asocial tendencies. It makes him inventive, resourceful, and conscious of his creative power. From that time on, learning and critical evaluation of the forces around him become part of his very existence.



The Basic Course gives research opportunities to students of different ages and backgrounds, to high-school as well as to university graduates. The methodology of inventiveness provides the common denominator for experimenting, testing and handling of materials and tools, for their action and reaction, for creating form. The problems themselves can be solved by everyone, within his intellectual and emotional grasp, by means of his actual knowledge, talent and his existing skills. This explains why the Institute abolished the antiquated system of credits expressed in marks and units.[•] The purpose of its teaching is not competition *per se*; it is not to compare the students on an "objective" basis of standards and average I.Q.'s but to stimulate them to their own optimum achievement by asking for everyone's best performance. Everyone's "best" has a remarkable quality in one way or another, emotionally or intellectually, conceptually or technically. In life, talents often do not develop because no one asks for proof of them. In fact it is generally denied that the average person has anything valuable to offer. But through the subtle pressure of expectation everyone overcomes self-consciousness and freely exhibits his best. And the "best" is contagious.

J. B. S. Haldane says (in "The Causes of Evolution") that the effects of competition between adults of the same species probably "render the species as a whole less successful in coping with its environment. . . . The special adaptations favoured by intraspecific competitions divert a certain amount of energy from other functions, just as armament, subsidies and tariffs, the organs of international competitions, absorb a proportion of the national wealth which many believe might be better employed."

aptitude tests—vocational guidance

The Basic Course in its entirety forges a working union, a spirit of cooperation for social aims. This is its main function since its vocational aspects, the acquiring of skills, can be assumed as a matter of course for any competent school.

The Basic Course is used also as a talent test. This has great bearing upon the student's choice of later professional training. Such a talent test—covering through two semesters—seems to be more reliable than any aptitude test known at present.

This fact has to be emphasized because it may give some stimulus to vocational guidance work and new techniques for aptitude tests. Such tests today are usually to fulfill ephemeral requirements of employment or personality-check. To be sure, they give a more or less clear picture about the existing abilities which can be readily applied in industry or war, but not about the latent capacity of the person tested. This is the very opposite of the desirable psychological attitude for educational testing and guidance which should not operate with the assumption that the most important activities for the individual are those which can be defined on the basis of his most obvious gifts and inclinations. It is just these talents which do not need to be emphasized in training as they represent the unique orientation of the individual and tend to develop

[•] *Alfred Adler, in his system of Individual Psychology, has pointed out clearly the psychotraumatic and inhibiting effect of classroom competition expressed in "grading" students, and, of course, John Dewey has made this practice a cornerstone of his educational theories.*



Fig. 54. O Texture exercise in wood, 1939

This is the very first exercise to learn to utilize hand tools

without outside pressure. The real problem lies in the care for the "missing" or less pronounced abilities which have to be disencumbered and fostered so that the individual may achieve a balanced state. The warning, therefore, is that never should a judgment be made about the student's personality structure and manifold potentialities *before* he has had ample chance to shed the often depressing clichés of his previous studies and to recover his all-embracing biological potency. The school tries to free the student, by unexpected outlets, from possible regressions and hindrances, giving him opportunities for creative expression in many fields.

This process of self-testing may take a full year. The only criterion is the student's work itself, judged by its completeness and expressiveness within his own system of departure. Here, as already stated, no objective, only a subjective standard is possible. The evaluation must rest with the potentiality of the individual, with his "best."• In other words, a good teacher should not press his "style" upon the student. He must try to judge everyone's performance within the logic of the individual departure, that is, correcting deficiencies in their relation to the intended solution.

• Since such "aptitude tests" seemed to be of value for the handicapped, during the war the Institute started an investigation of problems of rehabilitation. See the article "Better than Before," by L. Moholy-Nagy, in the "Technological Review", MIT (November, 1943). In cooperation with the Welfare Department of the State of Illinois, the Institute conducted different seminars, symposiums and classes—not only for handicapped veterans—but for professional workers, doctors, nurses, therapists as well. The result was gratifying, especially because of the applicability of the training techniques of the school. Conrad Sommer, M. D., Deputy Director, Mental Hygiene Service, State of Illinois, commented on his experience as follows:

"The Institute of Design's method of group therapy can be likened to psychoanalysis in that it reaches down into the unconscious. It often causes discomfort and anxiety for a time, since it bids the student to loosen his moorings from his inhibiting past.

"This seemed to be especially true in the class of which I was a member. In this class were a number of specialists with considerable skill in their fields. To each of us our special skill was an anchor giving us security. To raise the anchor and to sail out into the sea of heart-brain-creative experience presented a real danger to the unconscious. Hence, some anxiety and resentment ensued.

"Those, however, who dared to make the experiment found in their ability to navigate in this new field the kind of enriched and strengthened character that is analogous to what happens in psychoanalytic therapy, wherein a patient replaces the rigid, unconsciously motivated inhibitions of the past with a conscious direction of his life, making social use of all his potentialities.

"Another analogy that comes to my mind of the result achieved at the Institute is that of spontaneity—the freedom, the wholeheartedness expressed by children who have not yet been spoiled by wrong educational procedures at home and at school.

"Without at all presuming to state that the technique and approach of the Institute competes with or duplicates the technique of psychoanalysis, it is nevertheless gratifying that the unconscious can be reached and dealt with through a group technique without consequences of therapeutic results for a larger group than can be dealt with individually.

"The Institute's technique should especially be considered, as an adjunct to psychotherapy, for persons who tend to become too passive since it demands of the patient a certain activity in which the unconscious is involved.

"These creative experiences thus can be used to supplement the individual approach of the psychotherapist."

Fig. 55. O Audrey Eiger, 1942
Semi-automatic screwdriver (preventing excess friction)
This design suggests a substitute for the tool handles which—though mass-produced in molded plastics—still imitate wooden handles turned on the lathe, not fitting the hand too well

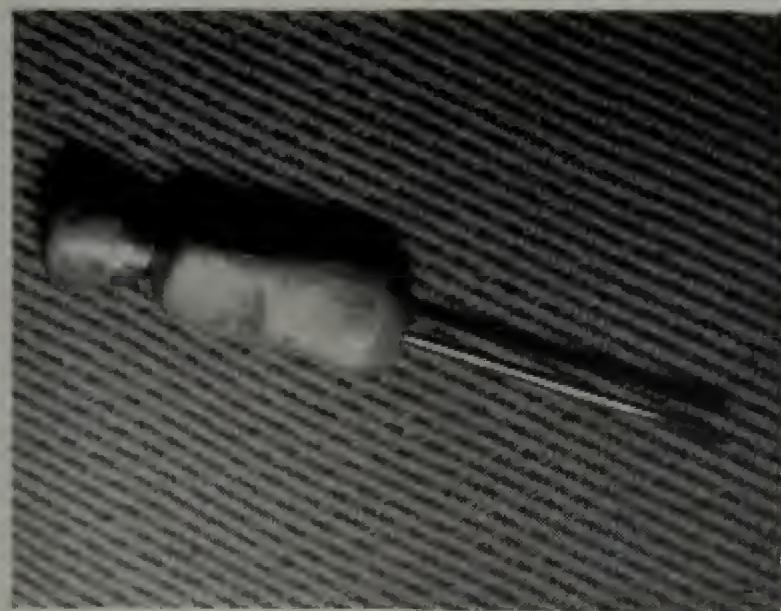


Fig. 56. O Robert Zinns, 1941
Drawing
The drawing is of a new type of plastic handle for screw driver designed by Eileen Gatechair
This new type of hand-fitting handles can be molded in plastics. They are the outgrowth of the hand sculpture exercises made in the basic workshop of the Institute of Design (See also Fig. 1)



Fig. 57. O Ann Binkley, 1939
Hand sculpture
The hand sculpture is a design on a rather simple level. Its only function is to be held and manipulated easily by the hand



Figs. 58 a, b. O Nolan Rhoades, 1941
Telephone (plastic)
A practical adaptation of the hand sculpture

hand-sculptures•

Pebbles on the shore disclose a great variety of shapes. They may have broken off from a rock in the mountains, washed down in a river into the sea, hit, rubbed and rolled against each other and against the bottom. Their shapes thus acquire intrinsic organic qualities—the inevitable result of the external forces acting upon the material. Hand-sculptures originate differently, but they can be understood similarly.

A hand-sculpture, an exercise in the Basic Workshop, is a carved shape usually made of wood. Its sole function is to be agreeable for the hands to hold, to play with. The hand-sculpture also can be understood as a space diagram; the result of the resistance of the wood to the forces applied—the carving tools combined with the intention of

• *Introduced by Ilin Bredendieck.*

the maker. When these elements are integrated in the processes as tightly as in nature, we may speak about organic quality. In such a case, all the elements are considered singly and in their coherence so that the end result appears as inevitable, as in organic matters. This is exactly the requirement. Although an artist reasons from a personal viewpoint, he must organize his materials so that the result appears objective. The transference of the personality must be absorbed so smoothly in the technical operations that in the end an indivisible entity is attained. This is a difficult, a maximum requirement, presupposing vital and conscious knowledge as well as subconscious assurance of judgment about technique, content, and aim of the expression. If such a coincidence between the expressive aim and the mastery of execution is missing, as in the case of the works of a child or a dilettante, then only "subjective" quality can be produced.

Hand-sculptures not only teach the student to recognize and produce objective quality, but have additional functions. They teach him to observe perfection of execution in the flowing curvatures, the faultless contours which can be viewed from any side. They are also exercises in surface treatment. If made of wood, they teach the student wood technology; the grain growth of the lumber and its rich play, working with or against the grain, the problem of the left and right sides of the wood in glueing operations, the different types of finishes.* They demonstrate the importance of tool handles which fit the hand. They help the student understand the necessity of controlled relationships between shape and grain and size; impressive simplicity as well as rich articulation. Hand-sculpture also discloses laws of volume articulation, the basic elements of carving and modeling. Sometimes these hand-sculptures show, in spite of the solidity of the material, a seemingly jellylike flexibility, full of twists and turns. They demonstrate the relationships of the curved and the straight, the concave and the convex, the solid and the perforated. This leads to the conquest of different spatial planes and levels, as in the spiral.

Hand-sculptures can be made in any material, clay, metal, stone, plastics. In fact, few exercises have such a basic effect upon the student's understanding of *form* as do hand-sculptures.

Pre-exercises for hand-sculptures can start as line drawings representing irregularly bent and warped planes. These can easily be shown with molded thermoplastic sheets, demonstrating the potential richness of a plain sheet if changed into three-dimensional structure.

* The "left and right side" are of practical consequence. The "side" designates the relation of the plank to the heart of the log. "Right side" is the plank facing the core and if used on the outside of an assembly it withstands warpage and disintegration better. (It is called sometimes the "weather side.") Left side should be glued to left side.

Fig. 59. O Gladys Rabung, 1943
Warping of a flat plane
(drawing)



Fig. 60. O Dorothy Pelzer
Hand sculpture
An exercise devised for beauty of shape,
grain growth and skill in handling wood





Fig. 61. ○ L. Moholy-Nagy, 1940
Convex-concave
Circular disk of transparent material, twisted and warped to demonstrate greater resistance against pressure

Surface treatment exercise and bending and warping planes can be the introduction to the understanding of the basic elements of modeling, of the relationships of the concave and convex and compound curvatures penetrating different spatial directions and extending to various levels.

Pre-exercises are made by line drawings (Fig. 59) which can easily be translated into thermo-plastic sheets.

weight sculptures•

Weight sculptures enlarge the sphere of observation and experimentation prepared by hand-sculptures. They teach that we have to deal not only with visual but also with tactile illusion. In this instance, the student designs objects for *both* hands. They must appear as equivalents in weight though their actual weights may be different. They may take on various forms and structures—static or kinetic.

There are various types of hand and weight sculptures:

1. the "fruit" shape (modeled) to catch in the palm
2. tricks for the fingers (to feel holes, and thickness)
3. spring effects (through pressure)
4. motion actions (by inclusion of the joints of the wrist)
5. twisting (by turning parts)
6. changes by motion of parts

tactile structures

Tactile charts and structures represent a refinement of the exercises for the hands. They are devised for finger manipulation of the different qualities of the sense of touch like pricking, pressure, temperature, vibration. ••

• Introduced by Andi Schiltz.

•• Many of these exercises are more thoroughly described in "Von Material zu Architektur," (Albert Langen, Munich, 1928) and in "The New Vision," (Putnam, Brewer & Co., N. Y. 1930; W. W. Norton & Co., N. Y. 1938; George Wittenborn & Co., N. Y. 1946) both by L. Moholy-Nagy. These exercises can also be used for the rehabilitation of the blind.

Fig. 62. O Robert Brownjohn, 1944

Tactile chart in bent plastic

Tactile charts and hand sculptures lead the students towards practical applications such as the design of better steering wheels, handles for refrigerators or telephones



Fig. 63. O Dorothy Riley
Precision exercise, 1939
The same design has to be executed with hand tools and machines to give the student an opportunity to observe many aspects of his work, such as suitability of tools, time, and precision of execution

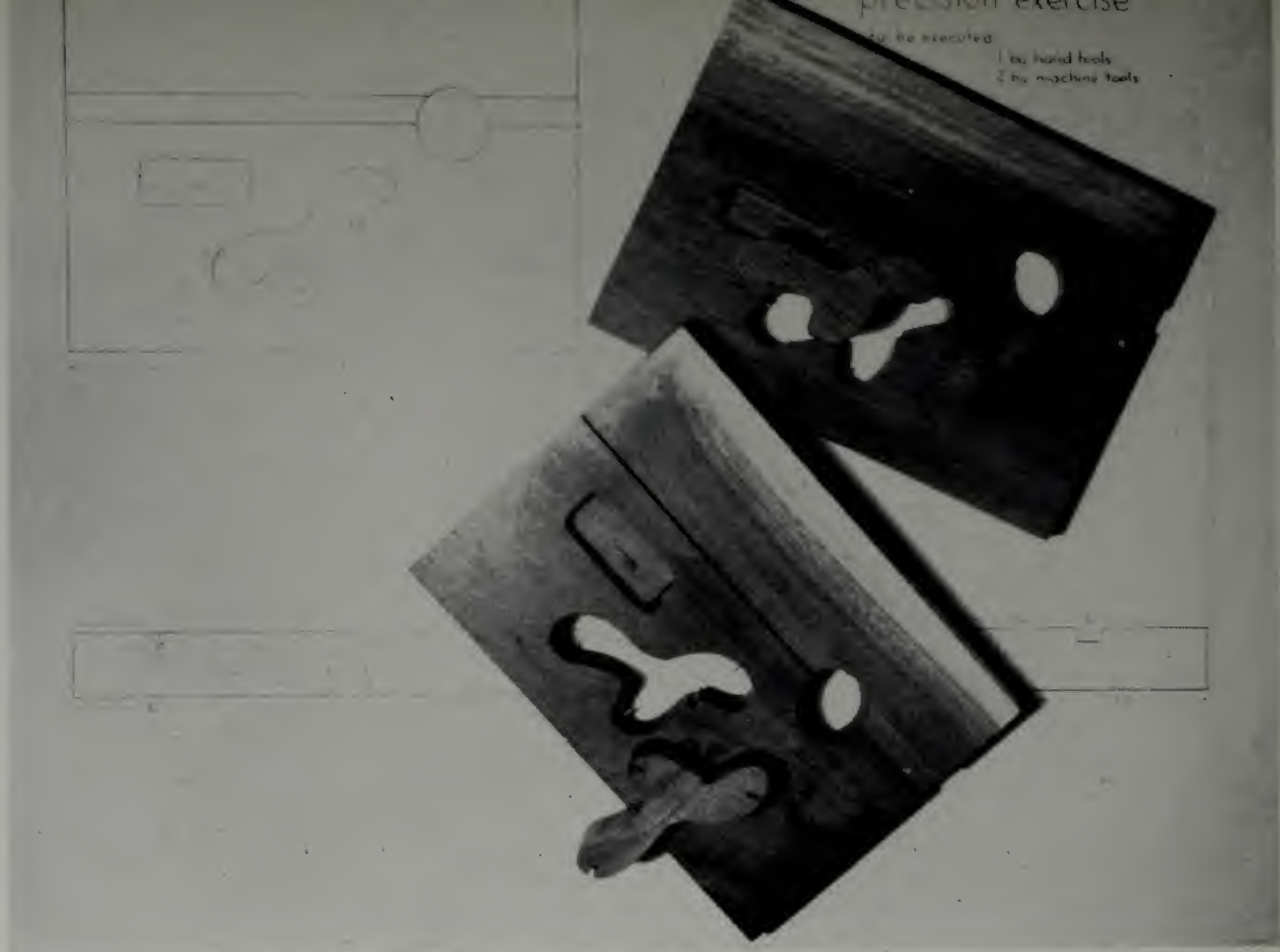


Fig. 64. O Alfonso Carrara, 1942
Woodcut
The woodspring inventions of the Institute of Design led to a great number of findings applicable for better furniture, the virtues of which will be cheap production, light weight, easy handling, and labor saving



measuring exercise

In the first part of this exercise a pattern consisting of a hole, horizontal and vertical grooves, geometric and free shapes has to be accurately drawn and blue-printed. The pattern then has to be executed in wood by use of various hand tools. Next the same pattern must be completed with machines. This exercise is suggested for the coordination of hand and brain, of hand tools, machines, and the eyes. Craftsmanship is here correlated with planning, mechanical drawing, design, and realization. The student learns to estimate time needs for each phase of his work, the difference between handicraft tools and machines; whether it is worth while to use a machine and to make a complete arrangement of jigs for one small operation; consequently, the exercise brings home to him that for a limited or individual production it may be more economical to use manual than machine processes.

machine exercise

Our relationship to the machine is still rather immature. We have not yet learned to integrate it with the social whole, that is to make it serve the human best. Instead, we destroy its social potentiality through an economy directed almost exclusively for profit and unrestrained competition. Education must acquaint the student with this situation and provide him with a moral power to improve upon it. On the other hand, education must also provide him with sufficient skill to use the machine as a tool in order to solve the design tasks of this technological age. For this purpose the "machine exercise" has been introduced as a first step.

A designer has to learn the working rules under which machines operate in order to make designs appropriate to the peculiar characteristic of each machine. In addition, most of the present machines are only primitive translations of hand tools and one day will have to be redesigned. The person best able to do this job will be the one who has firsthand acquaintance with these machines. In order to be made aware

of all the possible functions of the machines, the student has to invent and execute machined objects utilizing the possible actions of the powertools. When working in wood (blocks, dowels, slabs) such exercises bring amazing results. In many cases cuttings and sawings can be made by which the solidity of wood is changed into rubberlike elasticity.* Usually, such woodcuts are potential structural units which can be translated into practical uses. Since, however, in the Institute's first two semesters not utilitarian considerations but the development of inventiveness and resourcefulness is emphasized, the time of the beginner is devoted to imaginative solutions without the limitations of practical application, required later in the specialized workshops.

• *These exercises were the preliminaries to two dozen or more wood spring inventions, used as metal-spring substitutes during the war when priorities on metals prohibited the production of steel springs.*

Fig. 65. O Nick Savage, 1942
Woodcut



Fig. 66. O Angelo Testa, 1941

Woodcut for woodsprings

Other developments in woodsprings, made by the students, were tested and taken over by industry during the war (see Figs. 67-69)



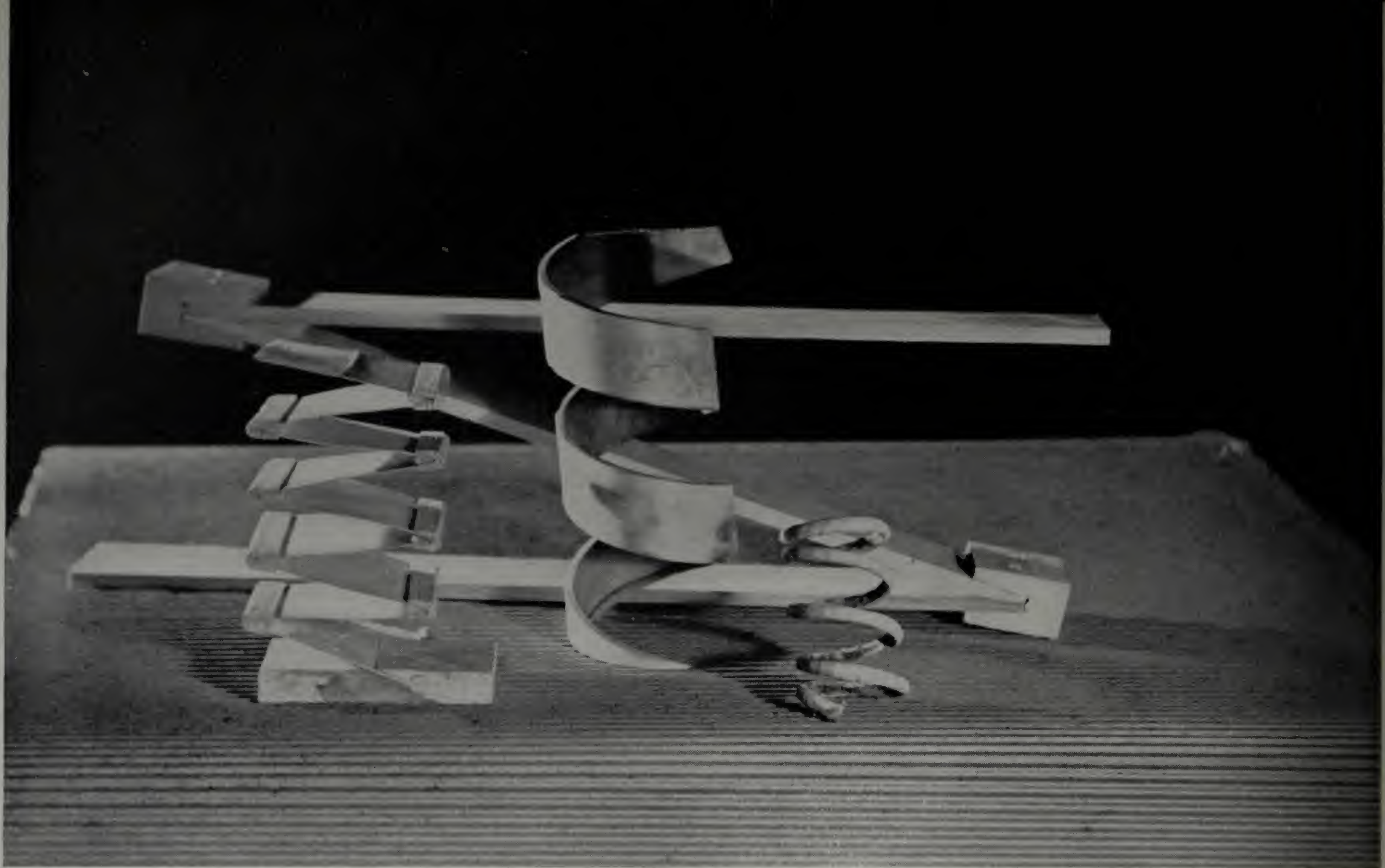
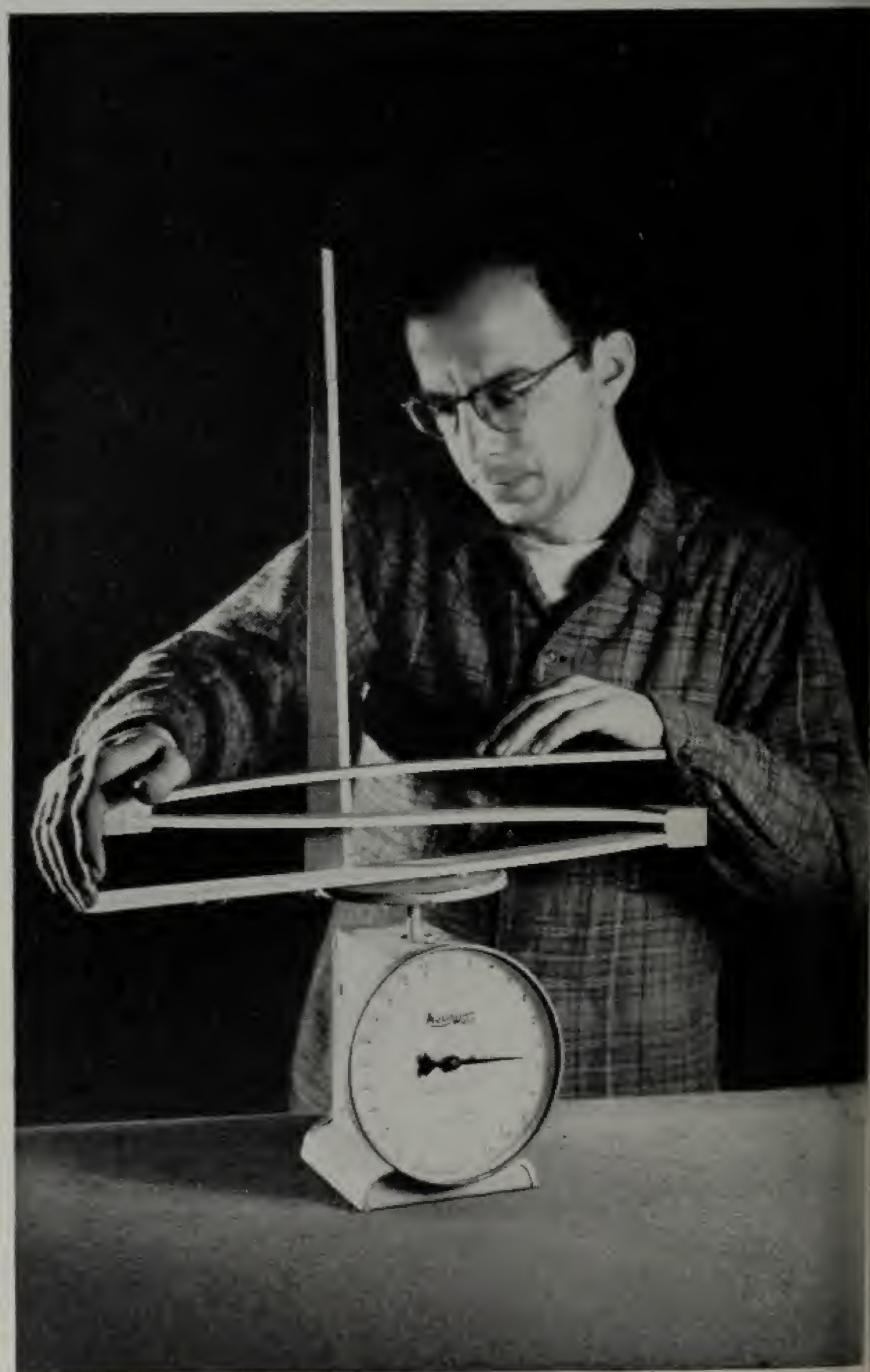
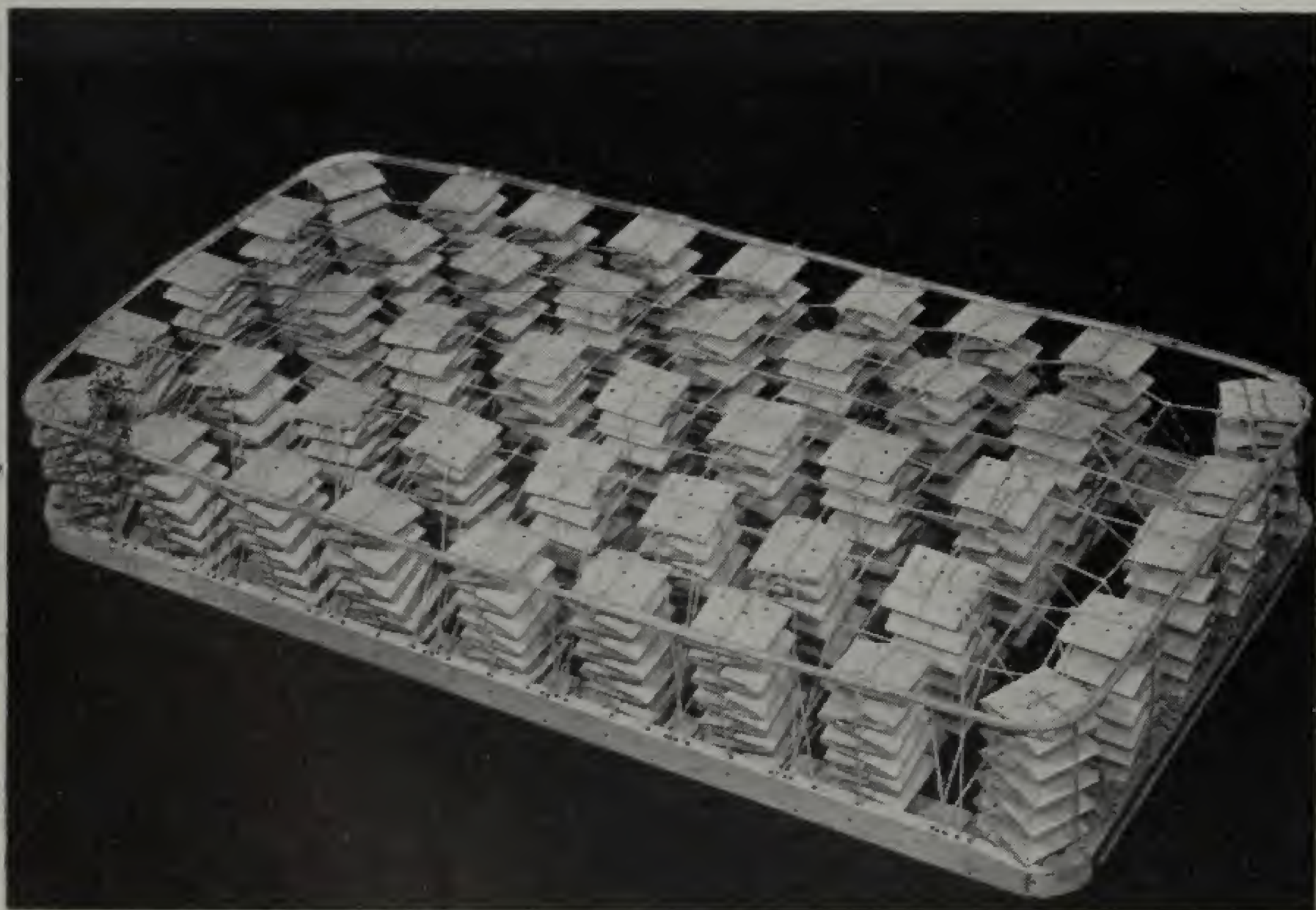


Fig. 67. ○ Four types of woodsprings
The large reversed "z" is made from
lumber; the smaller "z" shape (accordion
type) from thin veneer plates wedged to-
gether; the highest spring in the middle is
from electrically bent plywood; the small
coils from very thin resin bonded wood
strips

Fig. 68. ○ Testing the woodspring

Fig. 69. ○ Institute of Design, 1942
Woodspring mattress



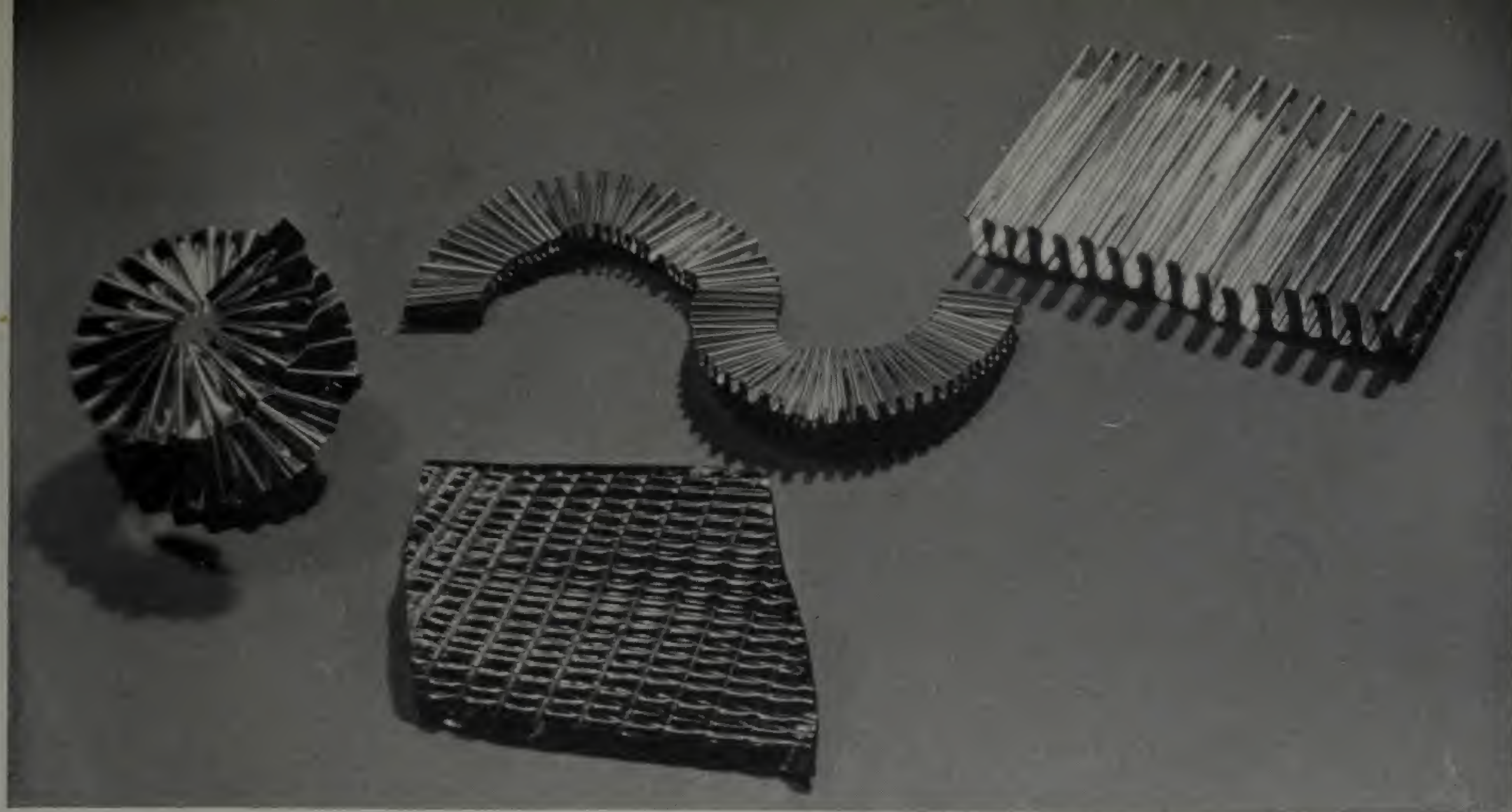


Fig. 70. O Institute of Design, 1944
Sheet metal, structurally bent

sheets, slabs, joints

Another type of exercise, adaptable to different materials and revealing hidden relationships and vital processes, are paper cuts. Here the task is the manipulation of flat sheets into three-dimensional structures. This provides the basic methodology for approaching any flat sheet or slab, such as cardboard, plywood, metal, wire mesh, and plastics. Paper cutting, corrugating, rolling, bending, weaving, scoring, are introductory manipulations not only to inventiveness but also to such basic engineering principles as strength of materials, stress and strain, tension and compression. Then the student is instructed in the customary type of joints, and is asked to invent new ones with the same materials, first irrespective of their practicability, later with the aim to accomplish useful and needed solutions. Exercises in the handling of slabs and sheets and the making of new joints is essential to many prevailing and potential production processes.



Fig. 71. O Arthur Kersten, 1940
Expanded metal structure
In spite of the thin gauge metal this structure carries 600 lbs

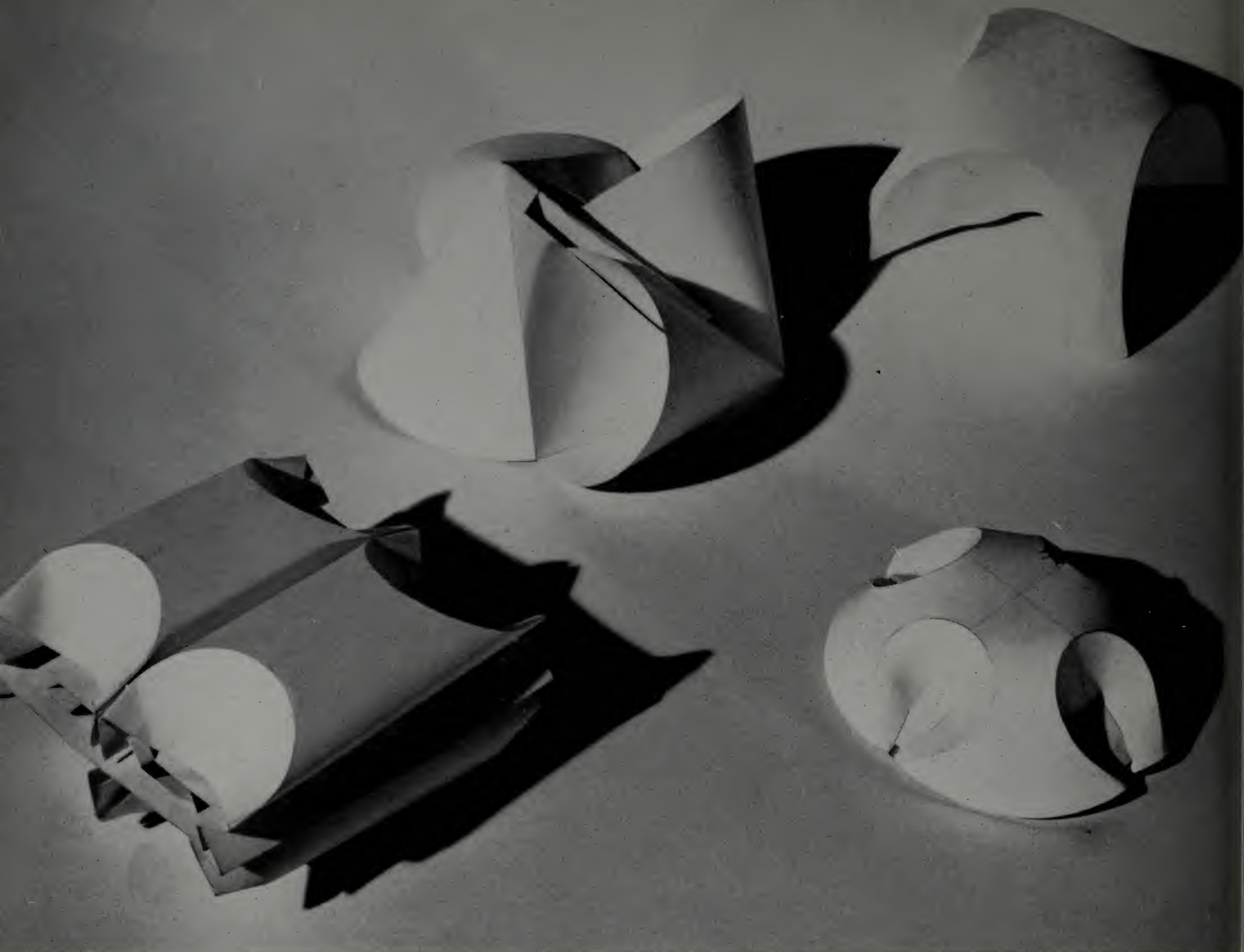


Fig. 72. O Institute of Design, 1943

Structural papercuts

One of the most important beginning exercises is the manipulation of a flat sheet of material into a three-dimensional structure. The same exercises serve also as subjects for studies of light and shape in the photographic studio. In the modeling workshop the elements of volume articulation are taught—modeling in clay and casting in plaster

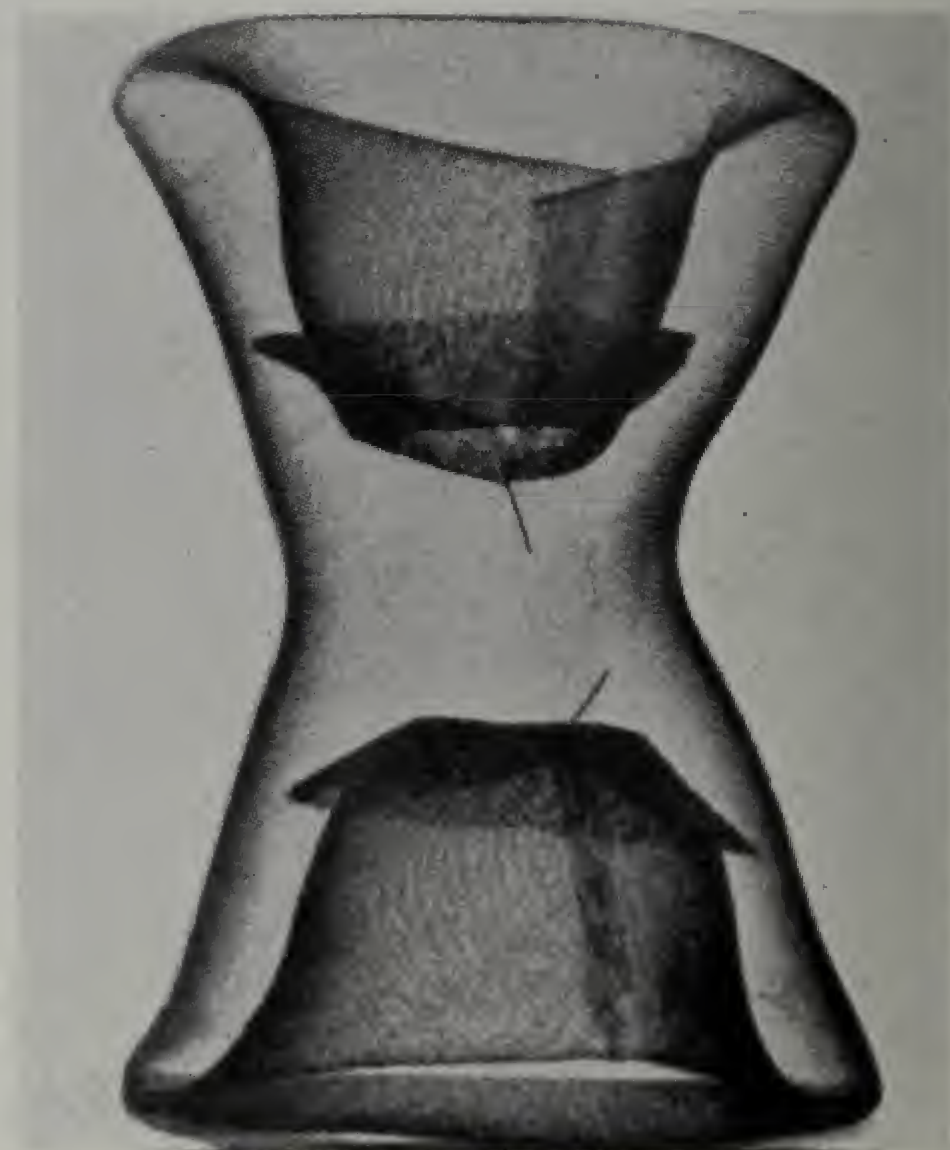


Fig. 73. O Georgianna Green, 1941
Elastic structure (wiremesh)

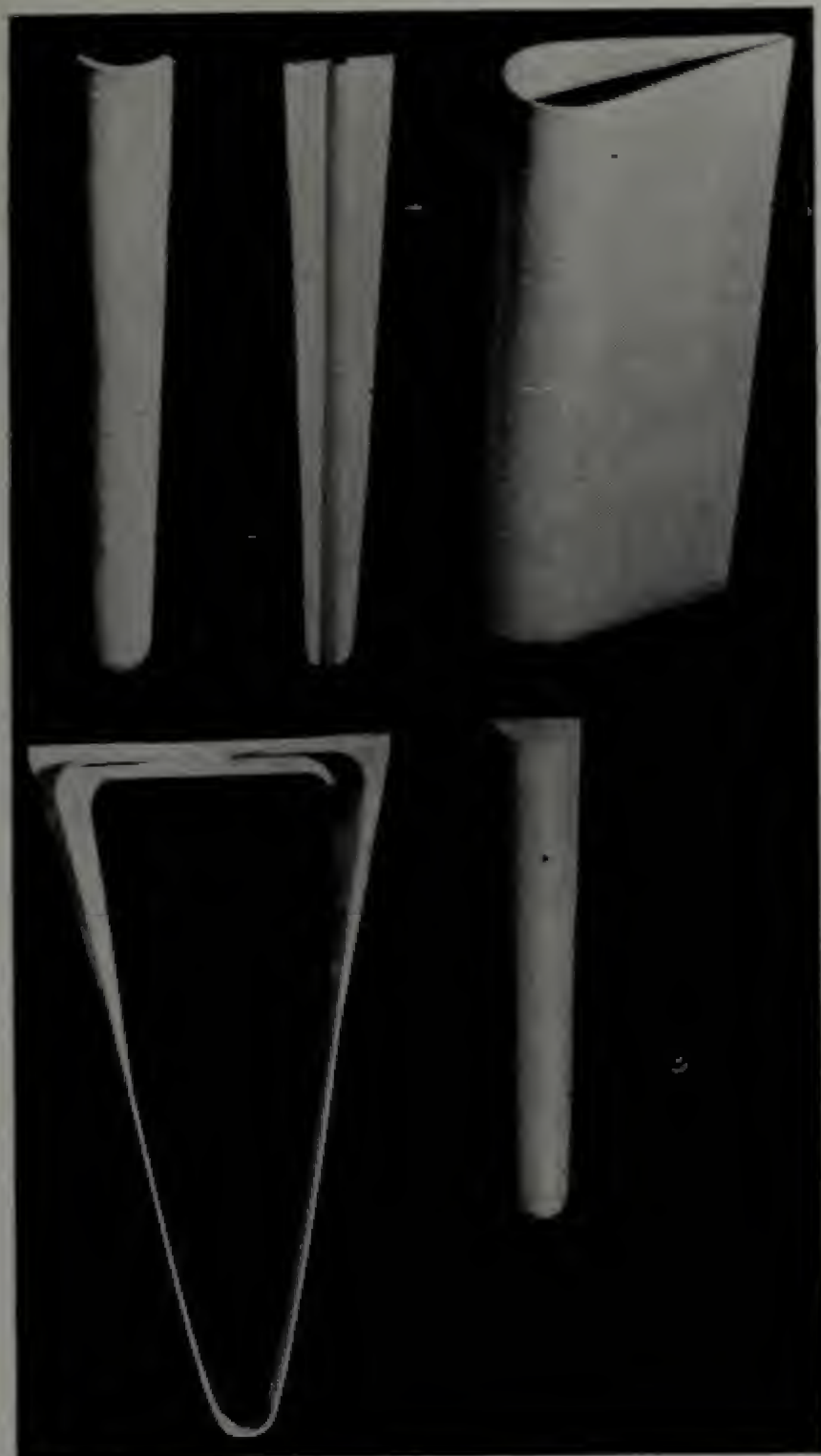


Fig. 74. O T. Torre Bueno, 1940
Papercut

Fig. 75. O Georgianna Green, 1941
Shock-absorbing wiremesh pillow

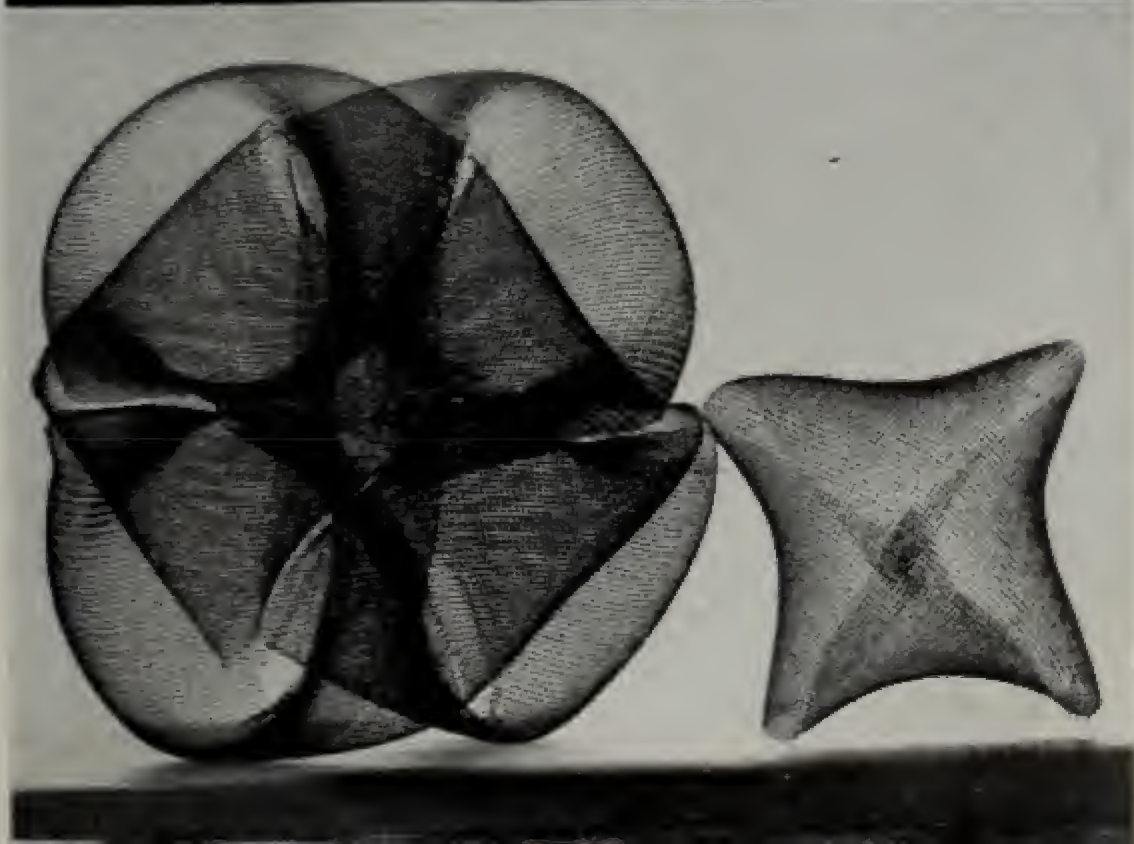


Fig. 76. O Henry Kann, 1941
Experiments for plywood legs for furniture

Fig. 77. O Design class, Institute of Design, 1941
Experimental plywood joints



Fig. 78. O Elic Nekimkin
Elastic wall
This structure originated through experiments with new plywood joints. The construction of the single elements can be seen in closeup in the illustration at the right



Fig. 79. O Millie Goldsholl, 1943-1944
Welding with plastic

One of the most interesting discoveries of the Institute during the war was friction welding. Mrs. Goldsholl says about her experiments, "It started out with a curiosity about how two plastic dowels would stick together when drilled into each other. The surprise came when the visual outlines of the injected dowel disintegrated where the two were joined. Apparently the intense heat caused by friction and then pressure had melted the contacting surfaces into a single transparent unit"

glass, mirror and spatial exercises

In order to introduce exceptional visual experiences, perception exercises in transparency, reflection and mirroring are devised. They lead to a visual analysis of space, to its general articulation and detailed modulation.

motion studies

Static space articulation, which has many subdivisions, continues with kinetic motion studies. They carry the student to an analysis of different types of motion transitions as well as to transmission systems and cogwheel shapes and schemes. These studies also appear in photography and sculpture• as exercises with virtual volume which again is related with one phase of the drawing and color work.•• All this conditions the student to the new terms of speed and space-time.

emphasis on "objective" quality

Behind all these exercises stands the vitalizing power of the arts. It is his firsthand experience, the analysis and the constant contact with the arts, that build up a feeling of security in the student and help him to evaluate any task in terms of intuitive organization and functional, organic unity.

the specialized workshops

Upon successfully completing the first two semesters the student enters a specialized workshop for professional training. The main principle of such specialized work is the study of design in theory and practice; industrial processes and materials, and the mechanics of a functional and creative approach. Here the student designs not only on the drawing board but executes his work in the laboratory as well.

However, the student has to know infinitely more, than a single workshop can give—he must work in various materials and besides his special problems he must reach out to other design tasks, for which systematic investigations constantly are carried out in the different workshops. Thus the Institute changed the old Bauhaus tradition of segregated crafts (for metal, wood, glass, stone, fiber, etc.) and set up only three departments:

architecture

product design

light workshop (advertising arts)

with the sub chapters of

weaving

photography

• See the chapter "Sculpture" on pages 216-243.

•• A very fine report on the drawing and color work of the Institute can be found in the book: "Language of Vision," by Gyorgy Kepes (published by Paul Theobald, Chicago, 1944), who was for many years in charge of Drawing and Color and the Light Workshop. It is most gratifying that, in the Institute, the young generation of teachers, though in most cases not connected with the old Bauhaus, is able not only to absorb its educational policy but to carry it further.



Fig. 80. O Millie Goldsnoll
Mobile

A rather complex motion can be accomplished by lifting the lever and rolling the little weights on the cone-shaped surfaces

Fig. 81. O Richard Filipowski, 1946
Space modulator

To make the student aware of the possibility of articulating space, he has to construct, as a part of the mechanical drawing course, a spatial construction. Besides this, he has to draw his "modulator" in the usual ways of architectural rendering, i.e. plan, elevation, section and perspective



motion pictures

painting

sculpture

The technological and intellectual development of the student is supplemented with related studies such as sciences, contemporary arts, form and civilization, philosophy of progressive education, economics, foreign languages, etc., and, most important, architectural design is taught from the third to the eighth semester to every student in order to develop a broad understanding of the relationship between his particular workshop and architecture.

In the Industrial (Product) Design Workshop an analysis first of all is made of design potentialities in the coordination of functional, technological, economic and social aspects. Then experiments are encouraged in plastics, bent veneer, plywood, glass, ceramics and metal. New principles for all types of goods are examined, for furniture production, household appliances, tableware, lighting fixtures, traffic light control, transportation vehicles, playground equipment, knockdown furniture for prefabricated houses, etc.

In the Light Workshop, a thorough re-evaluation is made of the elements of visual expression with emphasis on advertising art. Experiments are made in photography, the motion picture and display, with emphasis on the investigation of light and the rich possibilities of colored light displays.

The Painting Workshop carries the student through a study of the physical properties and chemical reactions of color, the ways and means of combining pigments with binders (vehicles like oil, egg, gum arabic), and their proper application. This includes experiments with all kinds of surface painting, preparing grounds, fresco, indoor, outdoor and three-dimensional color problems. The goal is to master color in any environment connected with any object.

The Textile, Weaving Workshop produces a great variety of textiles by means of loom and frame weaving, treating both theory and practice, including the reading and writing of pattern drafts. It also experiments with new materials, especially with plastics.* Designs for printed goods are also studied and executed mainly with silkscreen.

The Institute is a "transparent" organization. The "workshops" are in constant touch with each other; most closely at times when commercial orders** have to be executed, where various design tasks must be coordinated. Beyond this, *all* "specialized" students sit together in the architectural department where the basic elements of architecture, as the common denominator of all planning, are taught.

* Under the leadership of Marli Ehrman assisted by Elsa Regensteiner.

** From time to time commercial orders on a small scale (shop interior or exposition stand) are accepted. In the course of such work the student gains certain practical understanding. Emphasis on such tasks, however, would be undesirable to the overall teaching plan. A design research postgraduate department, on the other hand, should be an integral part of such a school.



Fig. 82. O Elsa Kula, 1940
Testing pigments, vehicles and binders
on varied background



Fig. 83. O Margaret De Patta, 1940
Material for curtain (cellophane, cotton
and rayon)

Fig. 85. ○ L. Moholy-Nagy and Robert Bruce Tague, with the students of the Institute of Design, 1942
Woman's apparel store



The textiles, shown here are handwoven in the weaving shop of the Institute of Design, Chicago, as models for mass production. They are worked out with comparatively simple patterns, and are mostly combinations of plain weave, basket weave, and twills.

Variety is acquired by thorough experimentation and intensive study as to density of warp and weft, loose or tight weave, free play of materials and colors resulting in a multitude of different fabrics for hand production or machine

production according to their suitability. A record is kept of each sample.

Marli Ehrman, the head of the Textile Department says:

"Exercises in designing of a warp as the basis for any fabric are at the beginning of "real" weaving.

An interesting warp is as important as a well selected weft. It lends itself to a great variety of textile designs.

A satisfactory warp which yields at least three good textile designs is transferred to a large loom. This work is

combined with renderings of woven fabrics and the design of tapestry which complement the training in color and material.

Tapestries give the possibility of freer play in materials, color and texture, eliminating certain considerations such as sturdiness, speed of production, etc., necessary in other types of textile design. Tapestries related to paintings and wall coverings could have a definite place in modern architecture."



Fig. 84. ○ Barbara Beardsley, 1942

Experimental textiles

All samples contain a variety of materials including plastic threads (Saran)

One of the most important exercises for the young student at the Institute of Design is the changing of a flat sheet of material—paper, screening, metal, plywood—into a three dimensional structure. By such manipulations as bending, rolling, weaving, twisting, scoring, embossing, etc., the structural properties of any material can be changed. Within this type of experimentation plywood receives attention as well. In fact, special care is given to it because plywood is a new material and with the invention of electric bending machines and high frequency glueing it becomes adaptable to new structural forms.

Formerly plywood chairs were bent by steam or were laminated from long grain veneer. The new resin bonded plywood can be dry-handled by electrical bending.

The Institute of Design has made innumerable experiments concerning the bending of plywood in order to define the best bending radius for the different thicknesses, as well as new constructions of plywood with wire mesh core to prevent cross grain breakage.

Through the glueing of simple bends even compound curvatures can be produced as the knockdown plywood chair by Charles Niedringhaus shows on the right.



Fig. 86. O Charles Niedringhaus, 1942
A knockdown chair with webbing
Electrically bent from resin bonded plywood. Weight, 6¾ lbs

Fig. 87. O Charles Niedringhaus, 1942
Stool in electrically bent plywood
The illustration at right (Fig. 88) shows the shape of the bent seat. The bending process creates a strong structure out of a thin slab of plywood



Fig. 88.



With the new resin and other cements wood veneer can be bonded to any other material thereby greatly extending experimentation. In using bent plywood for furniture, the traditional joints do not suffice so that new joints are needed. Thus experiments have also proceeded in this direction (see page 83). The aim was to cut down the number of joints making assemblage simpler as well as easier packaging and more advantageous transportation.

Fig. 89. O Charles Niedringhaus, 1941
Cantilevered chair

This chair uses fin construction for the body, and thin bent plywood drums for back and seat. The back and seat can be upholstered with airfoam covered with fabric fastened with a zipper for easy change and cleaning like the longchair, fig. 91



Fig. 91. O Charles Niedringhaus, 1940
Longchair

Its construction is ingenious: there are three flat oval plywood "pillows" of $\frac{1}{8}$ -inch thickness, upholstered with textile covered airfoam (see Fig. 92). The pillows are set in grooves between two plywood sides, the legs are of tubular steel. Instead of plywood, the oval pillows can be made also from resin impregnated paper-board



Fig. 92.
The covering of the back with air foam, wrapped around the $\frac{1}{8}$ -inch plywood drum fastened between the two sides of $\frac{1}{4}$ -inch plywood

Fig. 90. O Charles Niedringhaus, 1941
Plywood chair weighing $4\frac{1}{2}$ lbs
The same chair on a metal frame is shown left



New materials offer new departures in construction. Plywood is a new material and with the means of the new technologies it suggests the use of completely new shapes. The Institute of Design pioneered in furniture construction proving that an infinite number of new shapes can grow out of a concentrated experimentation.



Fig. 93. O Nathan Lerner, 1942
Pushback chair in plywood (one slab)



Fig. 94. O Nathan Lerner, 1940
One piece chair
This chair is made of a single sheet of $\frac{3}{8}$ " plywood bent into shape without waste, using only two lap joints. This construction produces a springy chair without upholstery; it may however be upholstered by affixing an airfoam pad, covered with fabric, to the seat and back

Fig. 95. O Kenneth Evertsen, 1940

Armchair

This chair has legs and seat constructed of laminated hardwood, assembled from four standard units which are interchangeable with other designs (chair and table). Chair may be used also with upholstery, combined with zipper for quick change and cleaning



Fig. 96. O Kenneth Evertsen, 1940

Freeform table

This low table "wraps around" the body eliminating the usual bending over to handle the objects, coffee cup, etc. It was designed to meet specific demands as to construction and economy of production for use in living room, lounge, bar, or restaurant. The legs are of bent plywood, making them strong though light weight



Fig. 97. O Davis Pratt, 1940

Suspended chair

This chair is constructed of two materials: steel tubing and resin bonded plywood. The frame and the plywood give slightly under the weight of the body, resulting in an agreeable spring movement comparable to an upholstered chair. The simplicity of the construction and the economy of the materials and labor make this chair efficient and inexpensive



Fig. 98. O Davis Pratt, 1941

Arm chair of plywood

There are no wood joints in the construction. Hung on a steel tube frame, it has a resilient back and plastic arms



Fig. 100. O Robert Zinns, 1942

Knockdown chair in plywood, held in place by only two pegs

With the combination of straight and bent plywood, a greater simplification has become possible in the construction of knockdown furniture



Fig. 101. O Henry Kann, 1940

Posture chair

This chair consists of three units: a tubular steel frame, a seat unit and a back unit of bent plywood fastened to the frame to fit and conform to the movements of the body. The chair is easy to clean and may be dismantled and assembled quickly for packing or shipping.

Figs. 99 a, b. O Jack Waldheim, 1943

"Beautyrest" rocker

This chair is designed for most varied use, such as porch furniture, rocker for convalescents, cardiac patients, etc. It utilizes for resting the old principle of reclining, but has the virtue of changing the position of the body without mechanical devices. By shifting the weight of the body the chair can be moved so that the legs rest higher than the head. The chair is well balanced; even forced motion cannot tip it



Fig. 102. O Edward Golden, 1945

Bed table for shut-ins





Fig. 103. O Florence Forst, 1943-1945
Ceramic and glazing experiments
New type of fingerfitting handles and new shape of saucers. Observe at the left two saucers for coffee and tea. The two cups are placed on a little hill so that the spilled liquid can flow down to the rim while the bottom of the cups remains dry, eliminating dripping

Fig. 104. O Leah Nolan, 1941
Tumbler
The tumbler is indented on one side to make it hand-fitting and to avoid slipping. At the same time this warpage adds structural strength to it, preventing easy breakage



Fig. 106. O Sarah Taylor Leavitt, 1941
Glass for iced drinks, with built-in "straw"



Fig. 105. O John Fleece, 1941
A "warm-over" (fireproof)
The larger vessel contains steaming hot water which is poured through the lid (this model was executed in the Pottery Department of the Texas State College for Women)



Fig. 107.

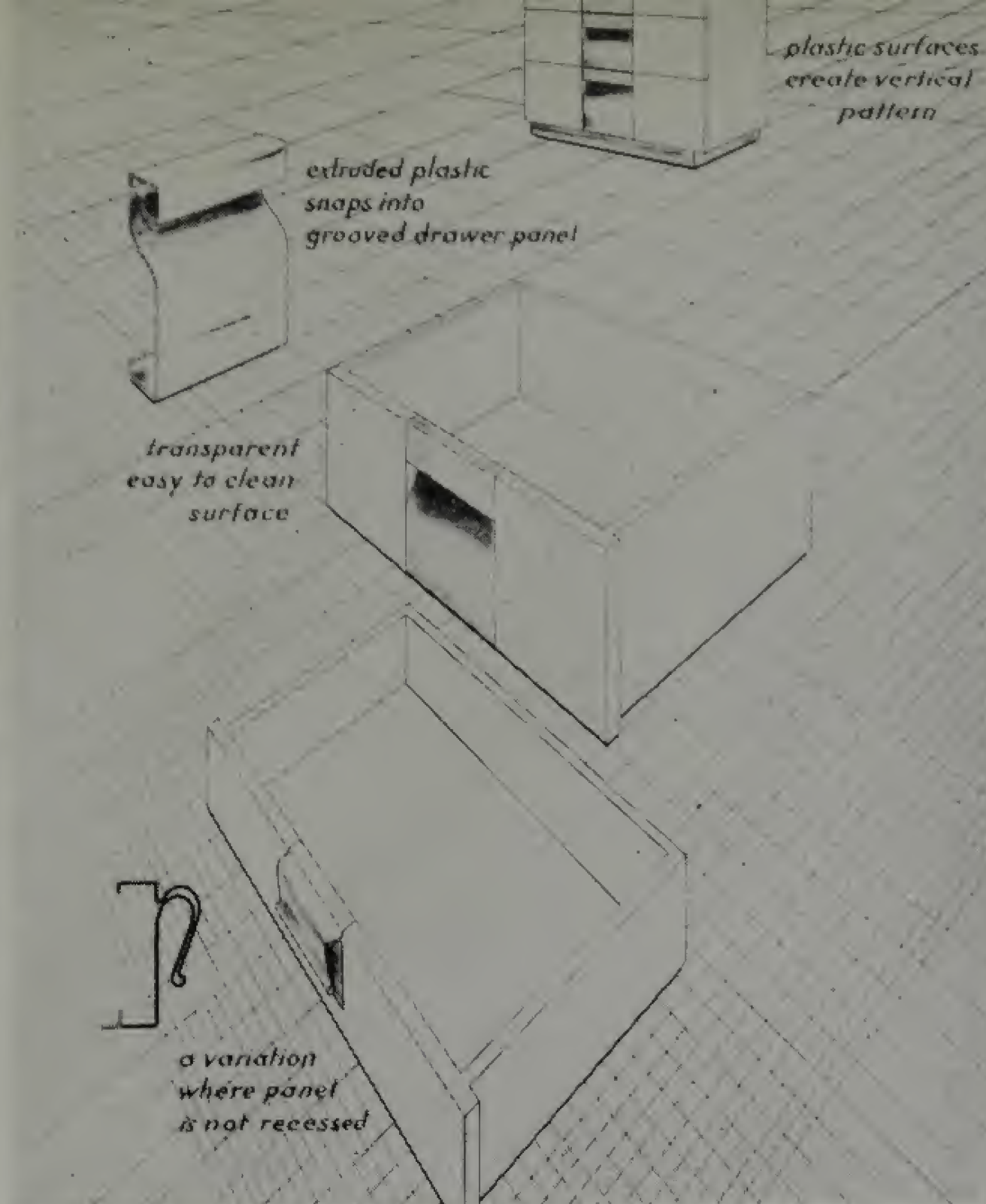


Fig. 108.



Fig. 109.

Figs. 107-109. O Robert Gatechair, 1942
Closet door and drawer handle (plastic)
The peculiar shape of these handles is the result of the lesser structural strength of plastic than that of metal

Fig. 111. O
A student of the Institute of Design, Chicago, demonstrates the process of bending plastic by heating. In the background is a plastic helmet for shielding against ultra violet rays of the sun, designed by George Marcek. In the same oven—equipped with infra red lamps—the design class baked chicken, beef, bread, cutting down the baking time 75%

Fig. 110. O Jewel Simonson, 1941
Costume jewelry in thermoplastics (methyl-metacrylate)



Fig. 112. O Margaret De Patta, 1939

Ring

The small pearl is placed under a magnifying rock crystal



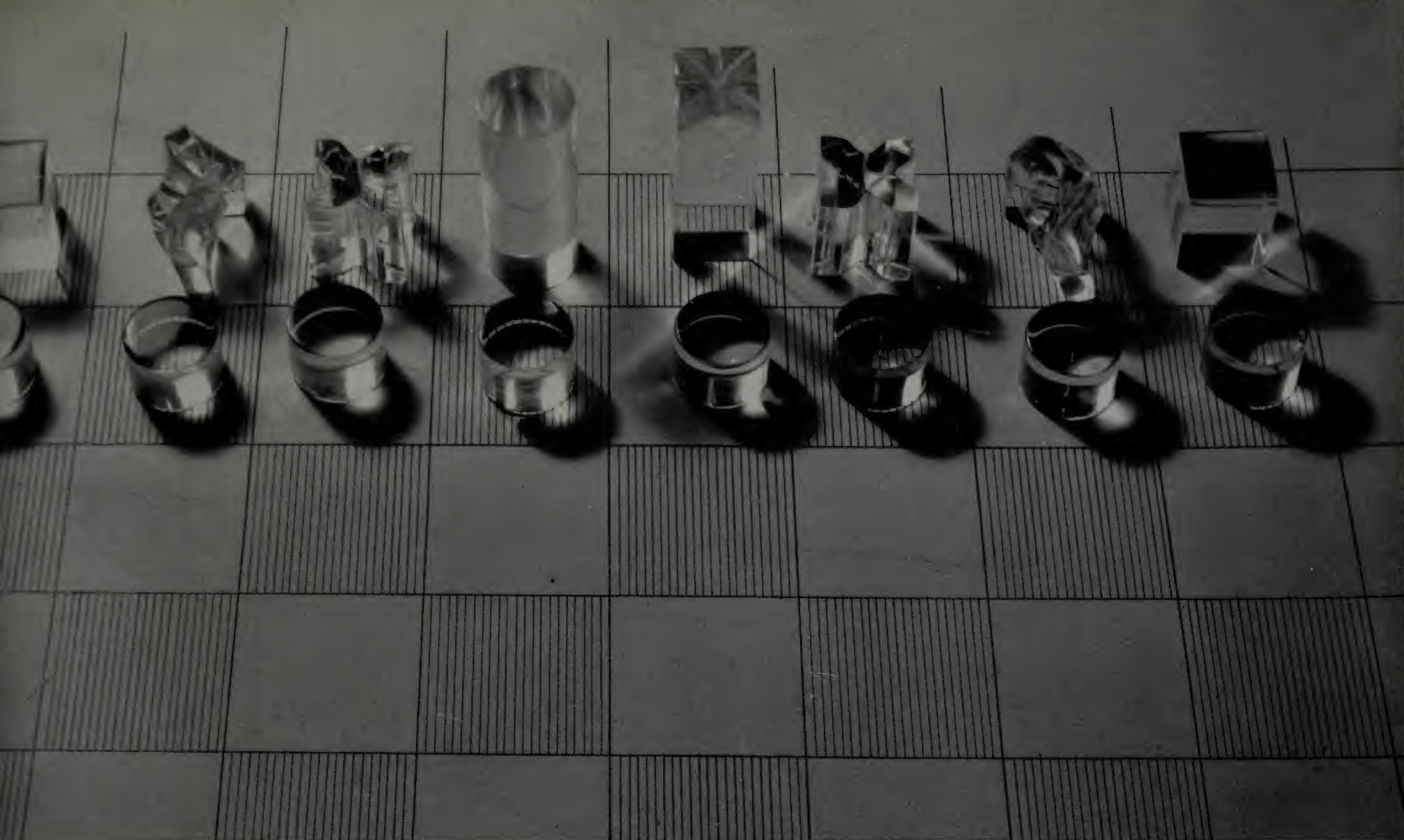


Fig. 113. O Richard Filipovski, 1942
Plastic chess set
This chess set, based upon an old Bauhaus idea, is not only attractive by its transparency, but the shapes of the chessmen indicate their moves



Fig. 114. O Sarah Taylor Leavitt, 1940
Traffic light control in plastic
This design allows even a color-blind person to observe the changing signs without difficulty. The red light is on the top in the form of horizontal lines (barring the traffic); in the middle is the amber light and below the green appearing as vertical lines (indicating the direction and flow of the traffic)



Figs. 115 a, b. O Nolan Rhoades, 1941
Plastic motor car (low pressure mold)
An attempt to utilize the eggshell construction in the new material

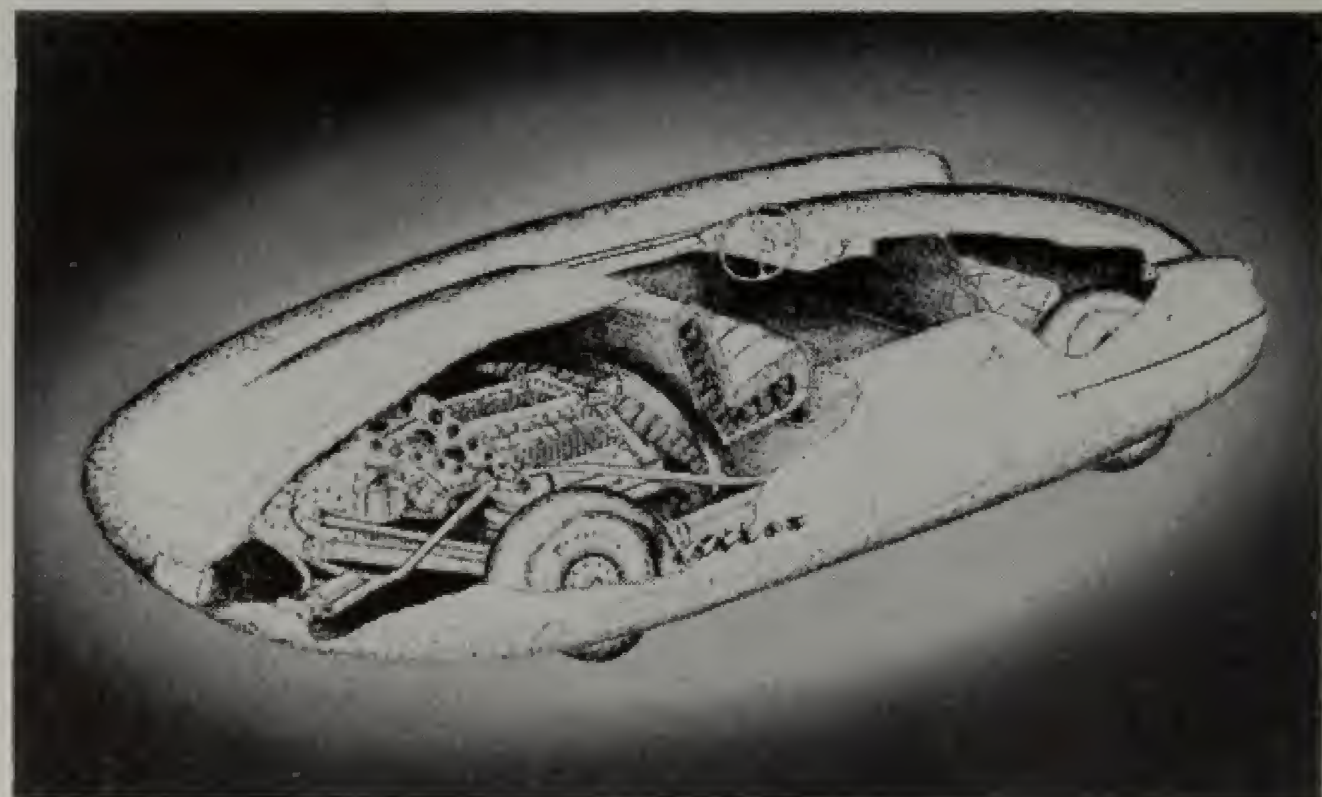


Fig. 116. O Nolan Rhoades, 1941
Cheap air-conditioning unit



the architectural department

Architectural education is in a state of flux. Though there is a "notion" that the developments of the industrial age require some attention, the fixations of the "beaux arts" education have so far held fast against a thorough change in terms of the new requirements. But the pressure of contemporary art and technology mounts. People have begun to appreciate the new industrial materials—steel, aluminum, plateglass, cement—the basis for a new structural thinking and the idea of "prefabrication for mass production." They have also become increasingly aware of the inevitable social requirements which will mold future architecture. Under these influences there exists a certain readiness to apply new methods of approach to architectural education.

In order to work efficiently and intelligently, artists, industrial designers, architects, have to master the fundamentals of plane, volume, space and motion (space-time). The fundamentals of drawing, color, modeling, mechanical drafting, photography, mathematics, physics, chemistry, and the humanities are the same in both architecture and industrial design. Thus the coordination of the education of the artist, designer, and architect is one of the most important aspects of training in the Institute of Design.

Knowing the essentials of architecture, the product designer will be able to cope with its demands. This is important because most of his work will in one way or another be incorporated into architecture. On the other hand, the architect will more capably judge the objects and products needed in his work; and his knowledge of industrial processes will be his guide for a long-awaited experimentation with mass-scale housing.

In the Institute of Design, the education of the architect and designer is united. Every design student, from the third semester on, is not only a member of a special workshop but automatically also of the Architectural Department. After the eighth semester the degree of Bachelor of Design can be received, after the twelfth, the Master of Arts.

mechanical drafting

The course in mechanical drafting—as well as lettering—starts with free experimentation in lines, to gain control of instruments and materials and to learn directly the range of potentialities and limitations of drafting techniques. This is valuable not only for future architects, but also for those active in other fields of visual expression. Before the student is asked to do geometric projection and other types of mechanical drafting he is allowed to use his ruling pen and compass freely to make thick or thin lines in any combination. The result is a "picture" produced by the mechanical drawing set. More significantly, the student's interest and pleasure are awakened in these tools—the first step to good draftsmanship. •

space modulator

The projective techniques are taught through an active rather than through the usual

• *This approach was introduced by Robert Bruce Tague.*



Fig. 117. O Marion Johnson, 1940
Exercise for the use of mechanical drafting instruments
The first plates in mechanical drawing stimulate the student's knowledge and interest in the use of his drafting set by free composition of the different line qualities

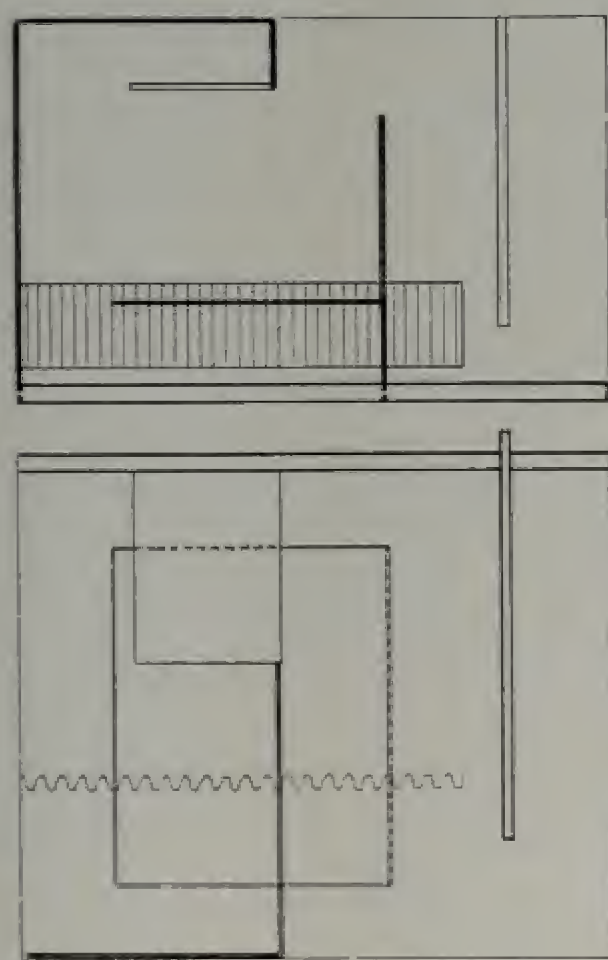
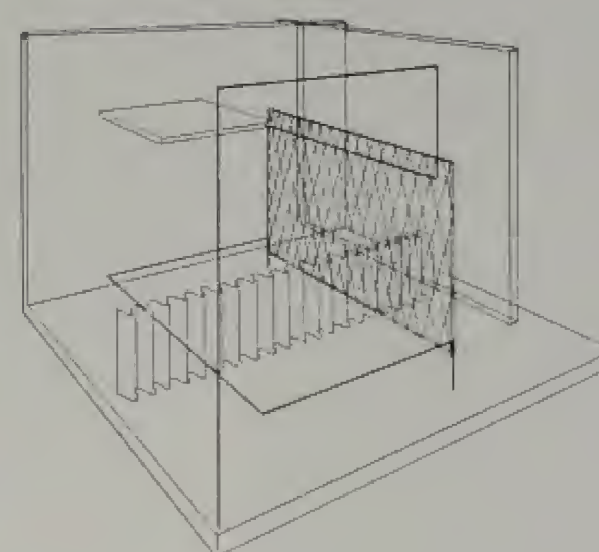
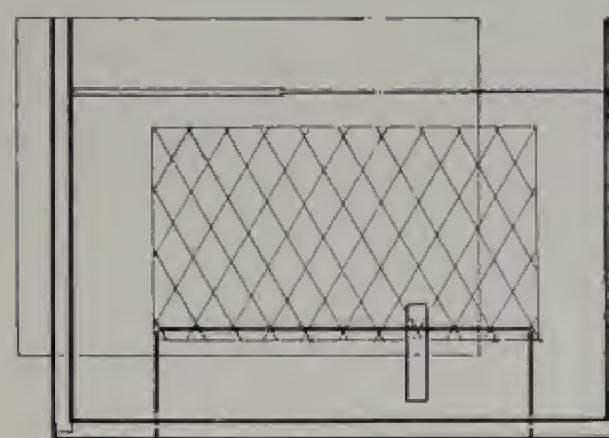
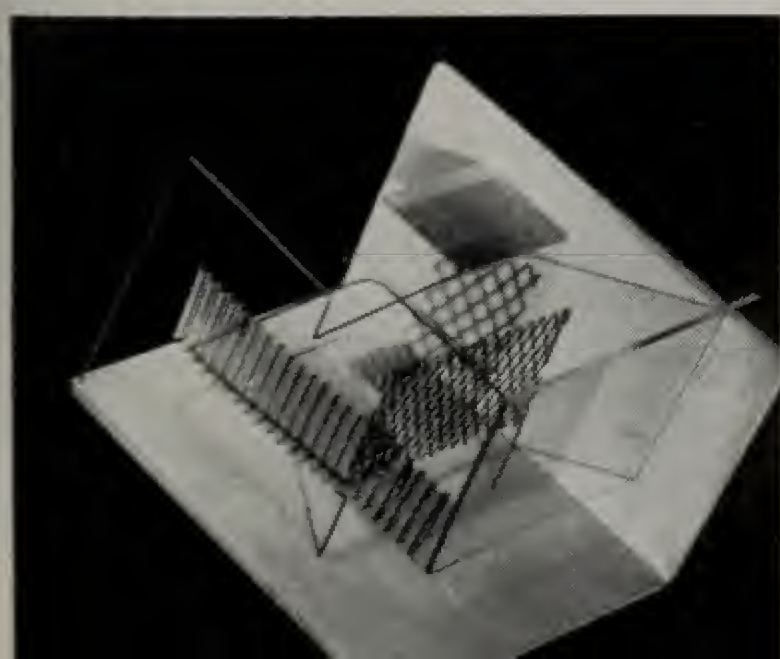


Fig. 186. O Mary McCray, 1944
Wheeler, 1943

Space modulator with elevation, plan, perspective and section



passive (verbal) approach. The student is asked to make a "space modulator", a structure which looks like a simplified model for a shelter or some type of building. It is made to develop the sense of space and explore the effective relationships which must be within the quality range of any architecture. Architecture must answer not only practical requirements but also has to fulfill the demands of a space "esthetic." Thus a space modulator is used as an ABC of architectural and projective space.



When the student has to draw an orthographic projection of it, including plan, elevation, section and different types of perspectives, he will have his efforts supported by the vital factual experience of making a model and articulating space. His abstract arrangement of line, plane and point emphasizes space, as opposed to the concept of a solid object, such as a cube, usually employed as the departure for all types of architectural drafting. In order to see the difference, in addition to the space modulator, a neutral cube is represented by all the foregoing means, drawn from the greatest range of viewpoints to demonstrate the factors bearing on the choice of vantage point and the relationships between the human eye and the camera lens. This teaches the "truth" about the object, the various forms of its representation and the degree of "truth" according to various aims.

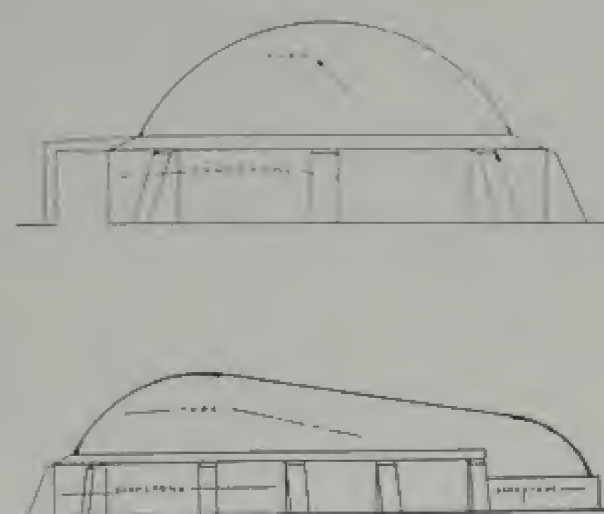
The space modulator provides the opportunity to relate design to direct work with materials as against previous architectural methods in which structural inventions were hampered by the shortcomings of visualization on paper alone. On the other hand, structural projects could be solved just as well by working with the model alone; but again this would not give the experience in visualization and development on paper which is essential to the exploitation of a "space fantasy", one of the main requirements of contemporary architecture.

the primitive house

In the study of architecture the tasks are approached with personal initiative and opportunity for individual research and expression. The first task is to design a "primitive house" in the functional, but not completely chronological, sense of the word.* The choice of the site in tropical or arctic zones, the climatic and geographical conditions, mountainous or plain territory, the availability of certain building materials, living and working conditions—all these are influential in solving the problem. Thus the student designs log cabins, stone and bamboo houses, grass huts, skin tents. One student used as a structure for his house the skeleton of a whale.

The primitive house is in more than one way instrumental to architectural efficiency. The whole process of erecting a structure for a given site leads the student to the resourceful rediscovery of functional principles, to the diligent evaluation of technological and biological requirements. In this way the student, without any other resources than his own capacities, is bound to re-enact the inventive mechanics of age-old architectures. Since the old tasks of indigenous construction are presented to the student living in the industrial age, he often re-thinks and improves the traditional handling of materials and techniques under the impact of the new technology which is his inheritance. As in a chemical reaction, the traditional technique and the student's sense of discovery are agents operating upon each other. The technique is modified and transmuted by his use, his thought and attitude are stimulated and invigorated by the pristine newness which he has found in concepts long accepted or taken for granted without question. A peg joint, for example, reveals unsuspected features

* G. F. Keck worked out a stimulating program for this project.



Figs. 119 a, b, c, d. O Alfonso Carrara, 1941

Whalebone house for the arctic regions

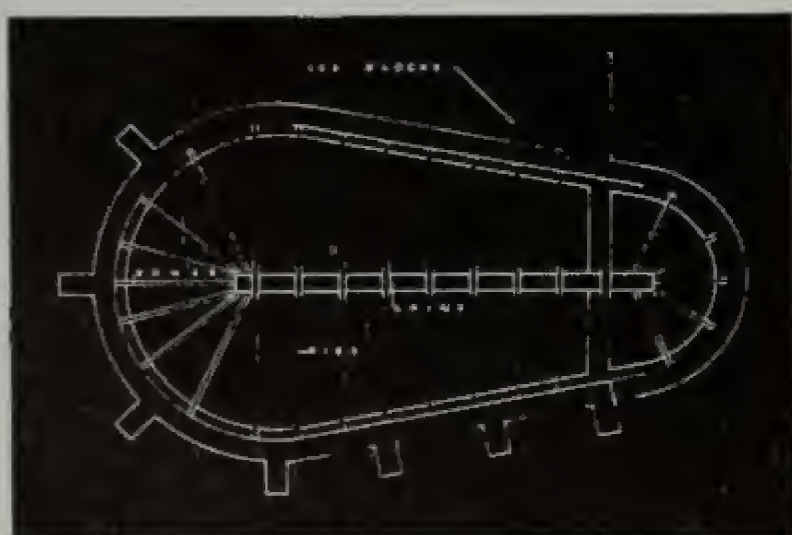
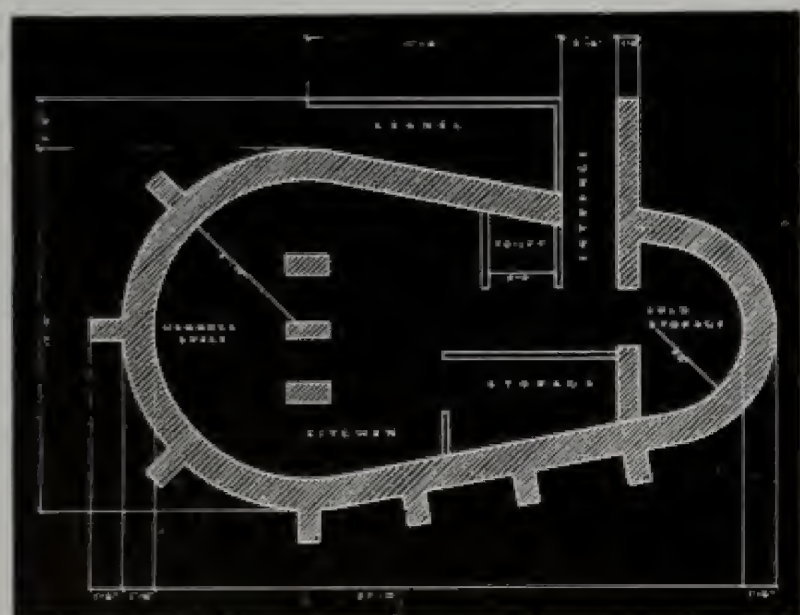




Fig. 120. O Robert Preusser, 1939
Tent made of hide for the steppe

about driving nails; a chair of plywood, with legs cut out from the flat sheet, brings home to him the function of the brace in lumber constructions.

It is easy to see now the value of the "pre-education" in the Basic Course. The artless and unprejudiced approach to structures and the studies of relationship of volume and space, leads directly to the more advanced and complex work.

There are a great number of other architectural and social tasks growing out of such a beginning. For example, "the comparative house". This involves the design of two identical shelters to be erected from widely differing building materials to display their peculiar characteristics and their effect upon the design of the structures. Thus, if the student designs a shelter by using stone or adobe and then a second time by using plywood or steel, the changes occurring in the spacing of elements

and their relative bulk fixes quite firmly in his mind the nature of materials and their effect upon his design.

Other problems are "the wheel and the foot" or "traffic organization in the community"; "community center" (a social and constructive recreational center rather than the usual shopping center). Such problems open the road to an understanding of contemporary needs rather than to the emphasis of "the house."

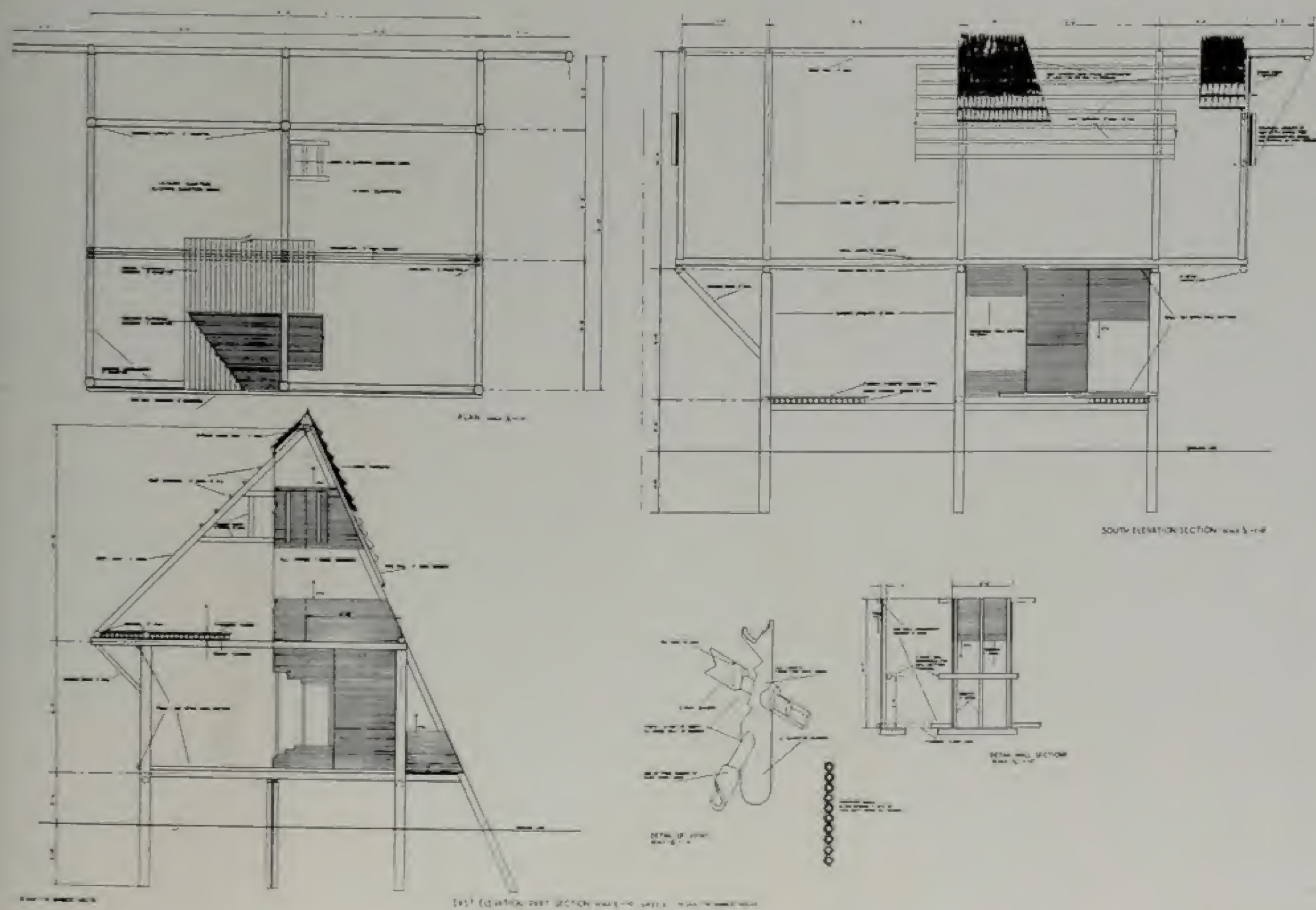


Fig. 121. O Henry Kann, 1940

Bamboo house for tropical climate

The first task of the architectural class is to choose a location for a house somewhere on the globe, the native geographic and material conditions of which the design must then consider so that they will define the shape of the house. The student has to solve the task without falling back on the resources of previous practices. But after the work is done he is asked to study and compare the traditional solutions in relation to his own version

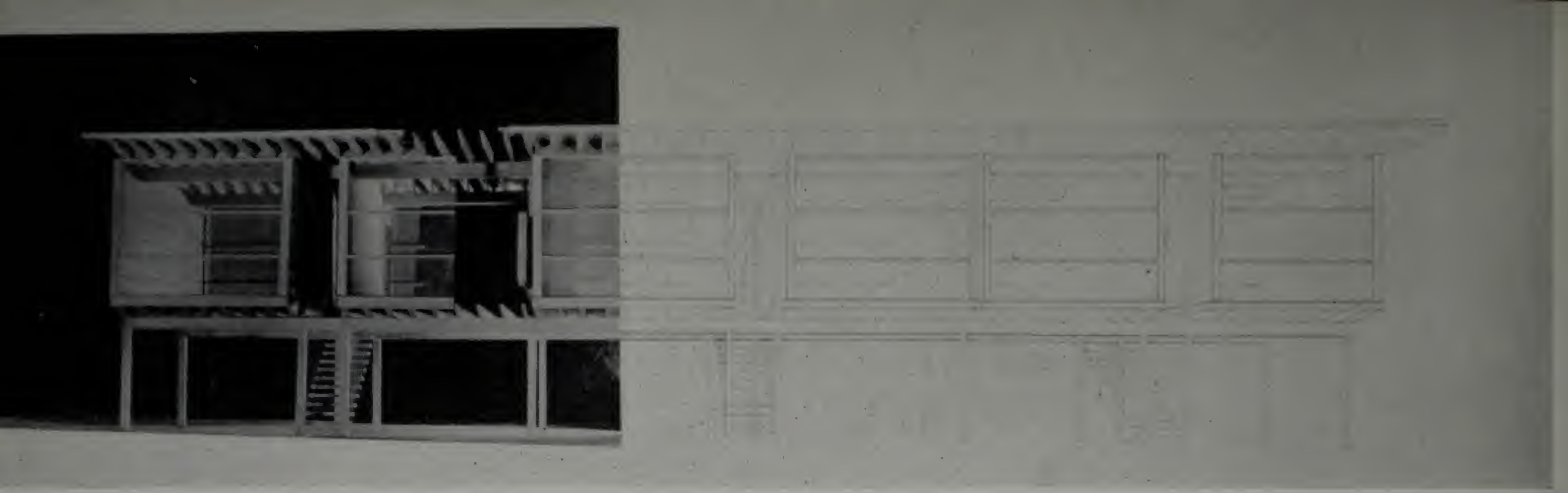


Fig. 122. O Henry Kann, 1940
Dormitory for the Institute's summer
school at Somonauk, Illinois
Design and model were executed by the
student himself

contemporary house

While in the primitive house (the exercise just described) mainly functional considerations are taken and only restricted material resources used, the approach to the contemporary house is an outgrowth of the functional and spatial demand of our day as exemplified in the space modulator. A dwelling should not be merely the fulfillment of elementary physical requirements. It must answer them in integration with an organic spatial solution, with the natural human desire for visual and plastic essentials. Man must have not only physical but also psychological comfort by experiencing organized space. The dwelling should not only be a retreat, but also a life in space, a full relationship with it. Thus in architectural tasks as well as in any other task at the Institute, the solutions have to be found through a method of approach which coordinates all elements into an entity. Houses have to be designed with the *simultaneous* consideration of plan, material, structure, facade and economy; these elements are not to be considered in succession but in integration so that each component acts and reacts interdependently. This is achieved through the mechanics of planning which, growing out of the previous exercises on a smaller scale, is proven here to be the universal guide for any project.



Figs. 123 a, b. O Beatrice Takeuchi, 1943
Studio house



In a later phase of these exercises, great emphasis is given to the reconsideration of organizing space in a free plan, without being limited by conventional room divisions, concerned only with the dynamics of placing equipment for convenient living. This approach frees the student from the fetters of obsolete standards, that is, from the idea that he must use architectural elements in the old ways, in unalterable shapes and positions.

The architectural studies again and again are interrelated with workshop experience. As the student of the architectural class is also a member of one or the other specialized workshop, he has an opportunity to closely correlate his workshop findings with his architecture. Thus, while he designs the structure of his house, he can also plan the interior, color scheme, furniture, and lighting fixtures with expert knowledge, fusing indoor and outdoor construction into a living unity. •

• That this approach has its merits is indicated through the numerous prizes which the young students under Ralph Rapson received in architectural competitions.

Figs. 124 a, b, c, d. O Rosalind Wheeler, 1942

Flexible apartment for parents, children and outdoor living

The children have their own complete quarters at the right. The parents might use the children's playroom for parties. Adult quarters, left. Sleeping quarters for parents upstairs, children downstairs. Parents look through glass wall on to the broad and expansive living terrace.

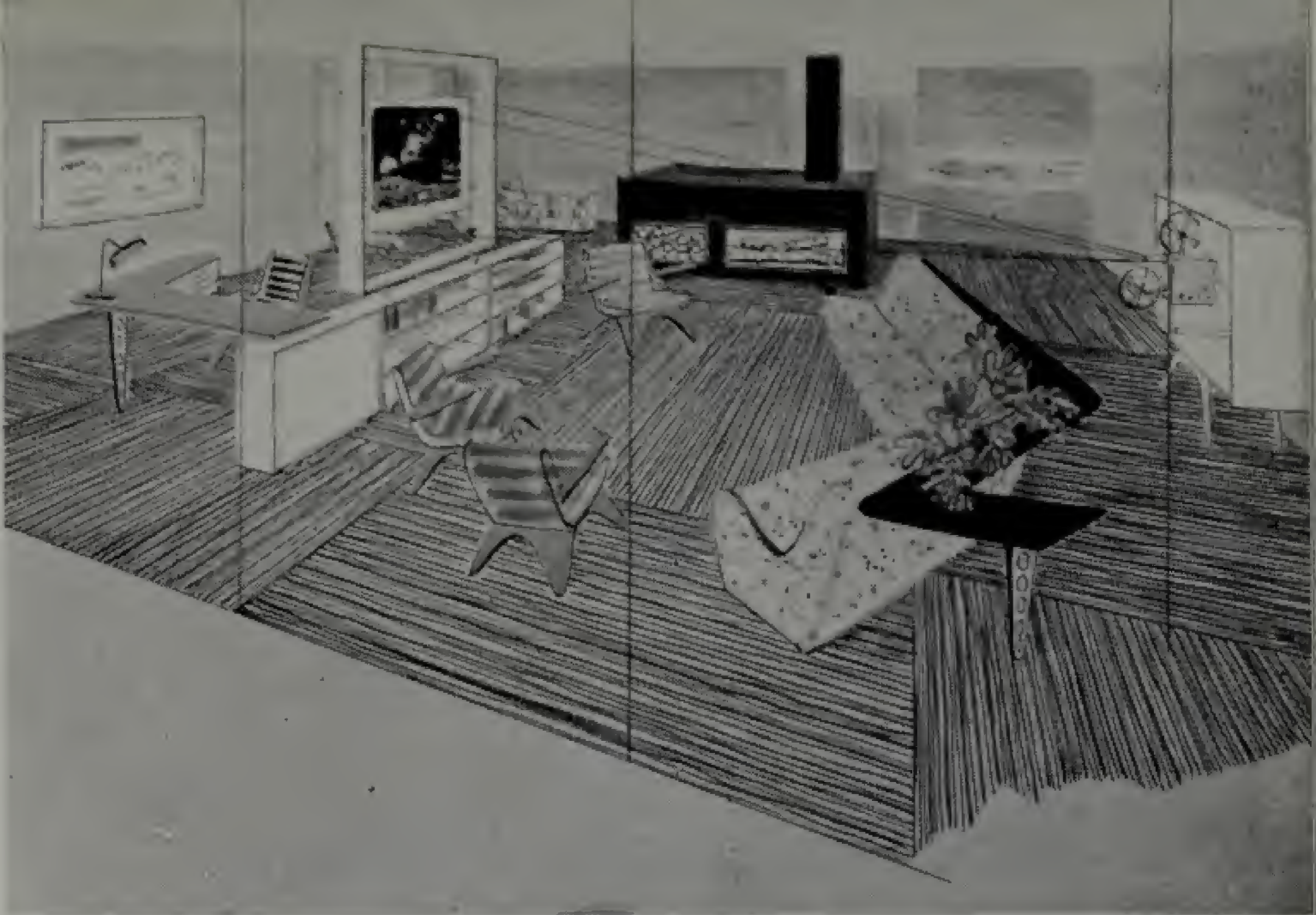
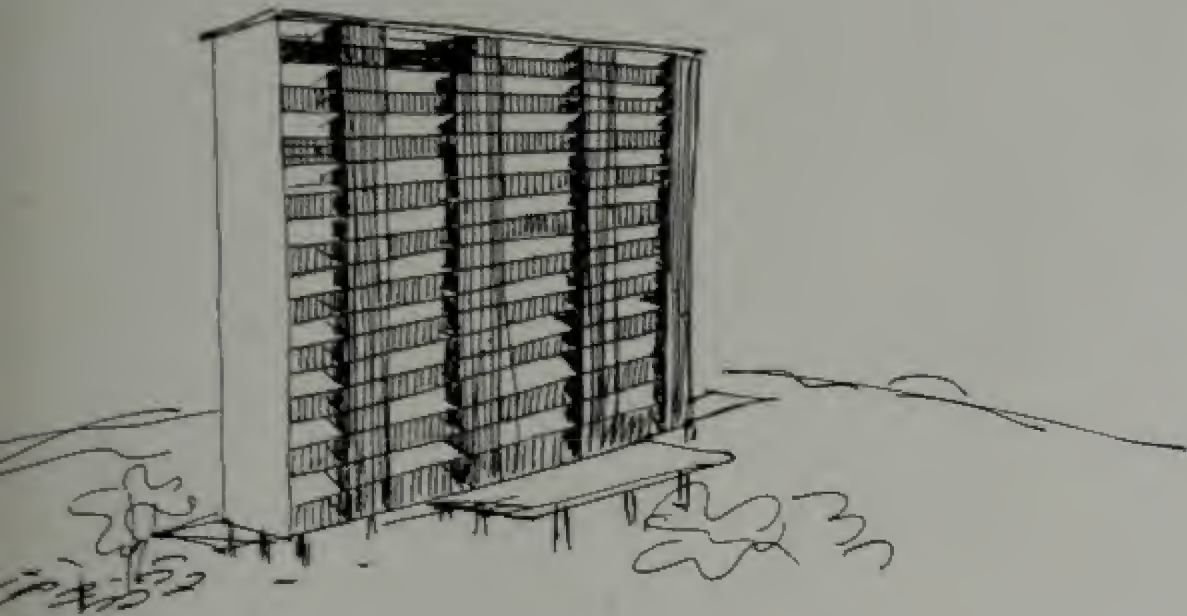
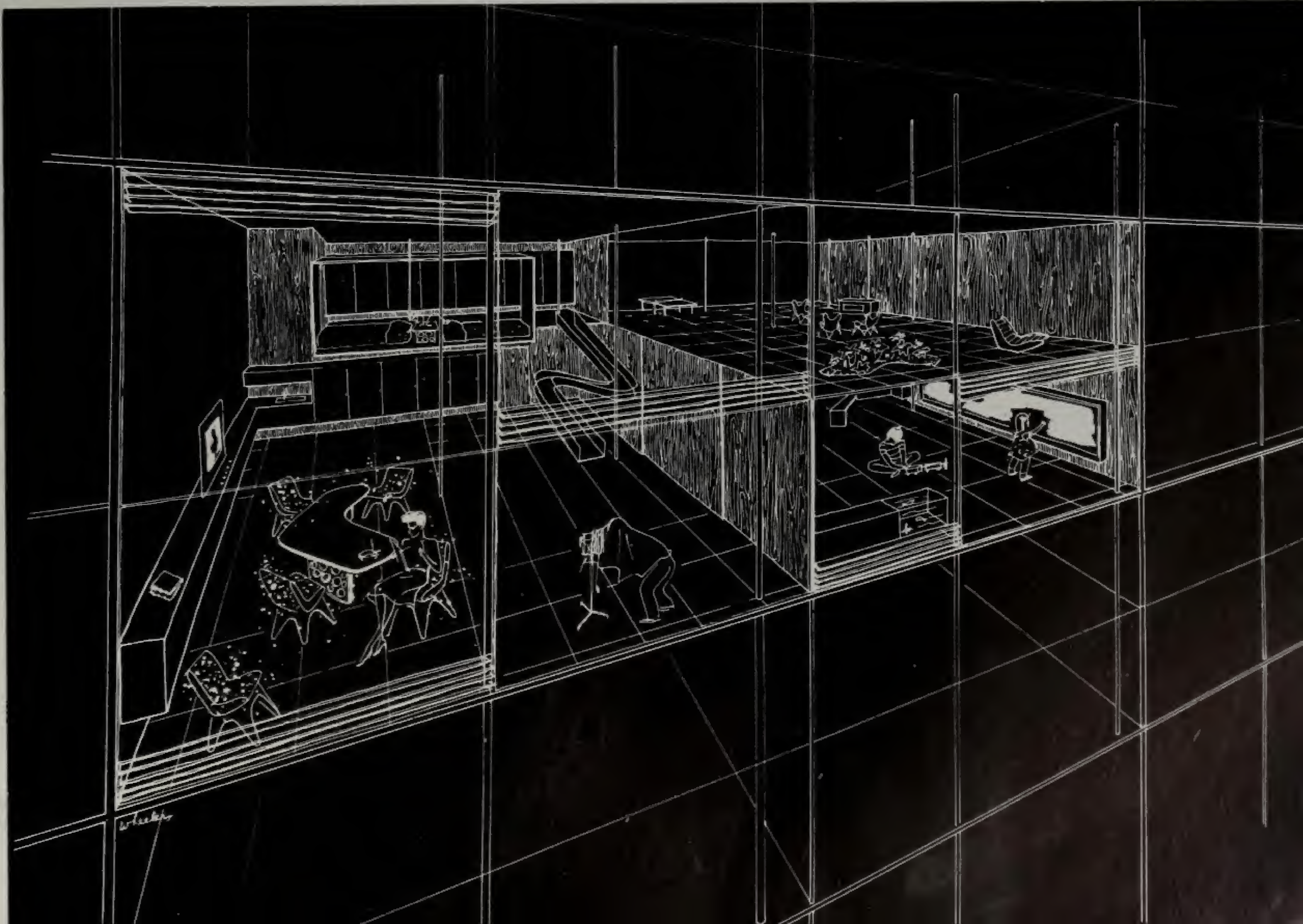
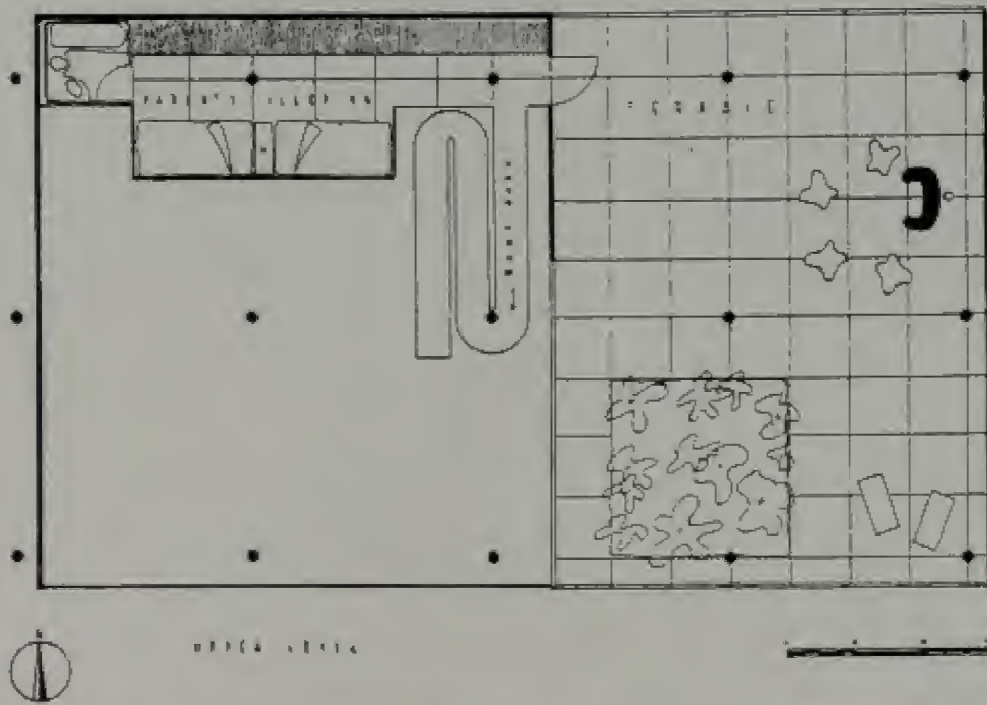
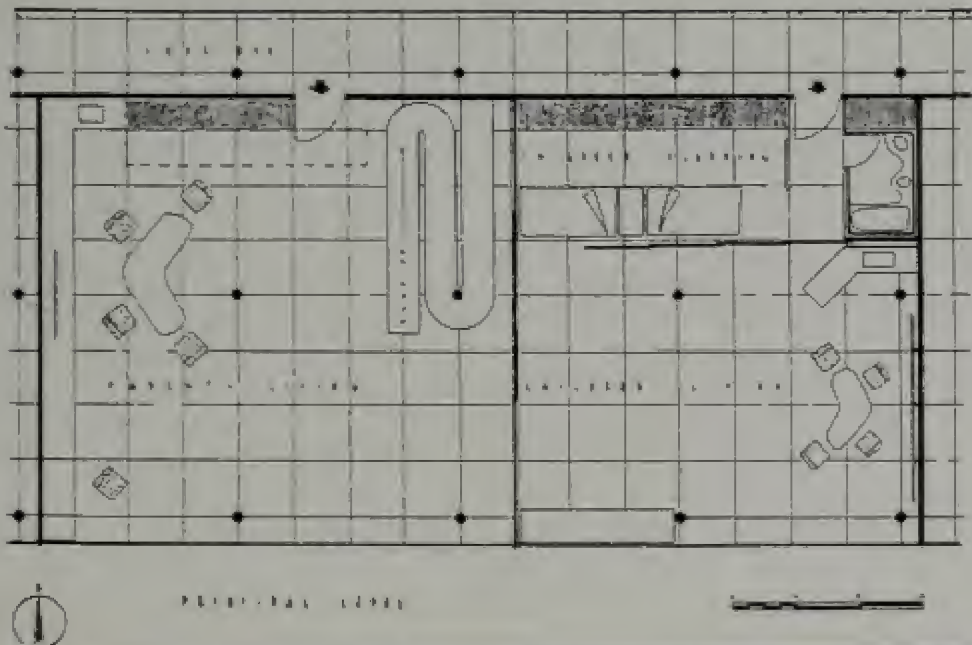


Fig. 125. O Rosalind Ray Wheeler, 1943
Living room with motion picture projection



the larger concept of structure

Architecture is a complex profession with manifold technological requirements, none of which can be neglected. Thus there arises the need for a new engineering training which, besides handling the normal structural engineering problems, must concentrate on intensive workshop research based upon the inventive mechanics acquired in the previous steps of training. To this belongs laboratory experimentation with architectural models, not so much as three-dimensional representations, but as studies in materials, techniques, and space structure.

spatial concepts•

In the past, architecture was understood mainly as an interpretation of spatial concepts in single structures, and architecture was conceived as a construction resulting from the materials. The type of construction determined the maximum size of rooms, their proportions, openings and fenestration, and through them the articulation of space.

Ancient architecture was solid, heavy. One of the world's most famous buildings was the Pantheon in Rome, with the largest free interior of the antique world, extending between columns set in a huge circle. From the outside, the Pantheon formed a precise cylinder adjacent to a cube—two heavy stereometric bodies with few openings. The old Indians of the Americas built similarly.

The gothic and later the renaissance architects started to articulate such bodies. There appeared convex and concave, large and small shapes with larger windows, but basically the building remained a solid volume, essentially not architecture but a modeled sculpture. The development of the *opening*—more than other elements—was responsible for the change of architecture from solid volume into light, airy structure.

In baroque architecture the basic geometric bodies, cylinder, cube and eggshape were retained but the volumes perforated. Architecture became lighter, seemingly less bound by the forces of gravity.

Then landscaping and gardening came into their own and influenced architecture.

Schinkel, the great German architect, groped toward a closer contact with nature. Around 1800 he designed a palace where the front wall was almost eliminated.

From such projects it was only a step to the buildings by Louis Sullivan and Frank Lloyd Wright. The Robie House in Chicago (1906) has a widely opened front wall and cantilevered roof, made possible by the ingenious use of reinforced concrete. The building is one of the great landmarks in American architecture.

The skeleton structure in steel is a characteristic American development which brought the "Chicago window." This has three panes, an immovable large center panel and

Fig. 127. Lubetkin and the Tecton Group, 1934

Penguin pool in the London Zoo
The secretary of the London Zoo, Julian Huxley, was instrumental in giving new direction to the zoological architecture of the world by commissioning contemporary architects to build shelters for the animals. This reinforced concrete "theater", erected with the collaboration of the Danish engineer, Ove Arup, shows an imaginative use of the structural slab which will be more and more employed in future architecture.

Besides the penguin pool, the Tecton group erected in London and Whipsnade a great number of other buildings—an elephant, a gorilla, and other shelters. The gorilla house is a movable structure; one-half of the circular drum forming the cage revolves. In winter the half of the building becomes a public hall (so that the cage itself is in a semicircle), and in summer or on warm days, the outer shell disappears behind the permanent cage, leaving only the semicircular skeleton of bars as an open-air cage for the apes.



Fig. 126. Mission of Rancho de Taos, New Mexico

This is a several hundred years old mission built of adobe, a yellow clay of the soil. The sculpture-like, monolithic shape is achieved by the proper use of an indigenous material which does not permit large openings.

• See also pp. 244-269.



Fig. 128. Artaria and Schmidt, 1928
Steel structure (Basle, Switzerland)
Such a skeleton can be filled in with
solid or with transparent glass walls, both
non-bearing



Fig. 129. Stamo Papadaki, 1932
Reinforced concrete framework for a
two-story building (Athens, Greece)
This skeleton can also be filled in with
non-bearing opaque or with transparent
glass walls. In spite of this, such frame
structures are often handled as brick build-
ings, camouflaging new potentialities with
obsolete schemes



two movable smaller ones at the sides for easy ventilation.* After the invention of the Chicago window Louis Sullivan pioneered the ribbon window which opened up the solid wall even more.

The transformation of solid architecture into transparency was carried further by the development of the crystal plate glass window. In combination with a bare steel construction a transparent apartment can be built. The beginning for this was the greenhouse and the world-famous Crystal palace in London (1852). The transparent staircase of the Werkbund building by Gropius (Cologne, 1914) translated these principles for industrial use. Later, the same type of transparency was suggested for a skyscraper, like the one designed by Mies van der Rohe (1923). If his model should one day be realized the transparent structure would appear as a gigantic soap bubble, plainly showing the deviation from the heavy solid mass of the Pantheon.

Contemporary architecture is built not from bodies but from slabs, from planes of different substances such as concrete, glass, sheetmetal, plywood. The penguin pool by Lubetkin and the Tecton group in the London Zoo and the Zurich house by Breuer and Roth Brothers show thin reinforced concrete slabs with ribbon windows

* *Chicago was a promising and fertile testing ground for modern American architecture until the Columbian Exposition in 1893. Since then the good work of the Chicago School, except for Frank Lloyd Wright, has been neglected.*



Fig. 130. Marcel Breuer and the Roth Brothers, 1934

House Giedion, Zurich

One of the best examples of contemporary architecture using the "slab" as the main structural device



Fig. 131. W. Polk, 1916

This building in San Francisco shows a complete glass facade. Except for "gingerbread" on the top, it could be the pride of any contemporary architect



Fig. 132. Paul Nelson, 1937

Model of the suspended house
Erected on a double arch construction, the living quarters in the shape of space cells are suspended from the ceiling



Fig. 133. Gustave Freyssinet, 1914

Reinforced concrete hangar for a dirigible in Orly, France

The arches constructed under the direction of the engineer allow tremendous inside space without disturbing columns

cut into the wall. Slabs are used for the floors, balcony walls; everywhere slabs, sheets, planes, instead of solid bodies.

Fenestration not only gives character to a building but determines the light quality of its rooms. The higher the window the better it solves its original function which is to admit light deeply into the room. This was the basic principle leading to the development of a functional fenestration of the Bauhaus, built by Gropius in 1926. Classrooms had long ribbon windows; the studios of the older students large single windows combined with glass doors; and the workshops a full glass curtain, four stories high. It was more than a coincidence, rather a proof of right and timely reasoning, that similar light and transparent glass skin was independently used at many places from Budapest to San Francisco.

An interesting application of the opening can be found in a new arch structure, the "suspended house" by Paul Nelson. The single rooms are suspended from the ceiling in a honeycomb construction providing space for a large living room two floors high, that amplifies life and vitalizes the qualities of recreation and leisure.

In a French school (Serrières) the children themselves can, with little effort, fold away the surrounding glass walls, so that the classrooms can be changed into a garden.

Different functions of buildings, different functions of rooms ask for different fenestration. Airplane factories must have columnless workshops and large openings similar to the hangars in which airplanes are stored. In reinforced concrete, by using parabolic arches, immense free areas can be produced. Truss constructions engineered for such purposes show increased openings. The newest suggestion is that the roof be supported by pressed air columns; limitless open space could be provided without impairing movement or sight.* Such structural solutions will largely define the form of the new architecture, but it is still difficult to see its correct shape because we have not yet found the way to fit it to the human scale. The problems of noise and visual insulation in structures without partitions have not been solved either and here only experiments can lead the way. But the fact stands out: architecture—today more than ever before—could fulfill biological requirements, a basically sound living with air, sun, light, and vegetation if the public demand for it could be crystallized.

If architecture is to be an integral part of the biological whole, then the individual's personal wishes have to be brought into a healthy balance with the requirements of the group. The concept of shelter must be extended to a large-scale social planning including civic and community centers—as germinating ground for public opinion and a democratic civilization, including the arts. And what a task remains smoothing out the ugly discrepancy between present living and future potentialities and what a task of a planned use of all land!••

* H. H. Stevens, Jr. (*Architectural Record*, Dec., 1943)

•• See the book of CIAM (*Congress of Modern Architecture*) by Jose Louis Sert: "Can Our Cities Survive?" (Harvard University Press, 1943), an excellent survey of the contemporary situation.



Fig. 134. Van der Vlugt and Brinkman, 1926

Van Nelle factories in Rotterdam
Artificial light enhances the crystalline

quality of this building with its excellent fenestration. The Bauhaus in Dessau by Gropius and this factory have been considered for a long time as the best European examples of large scale architecture

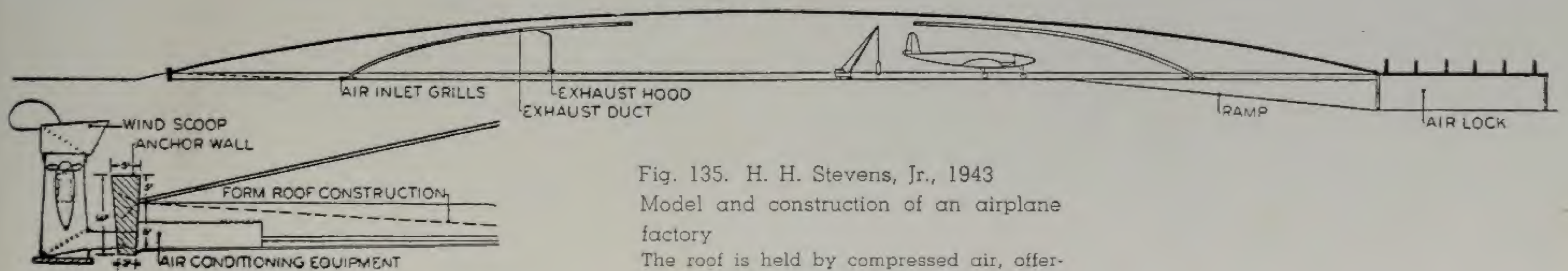
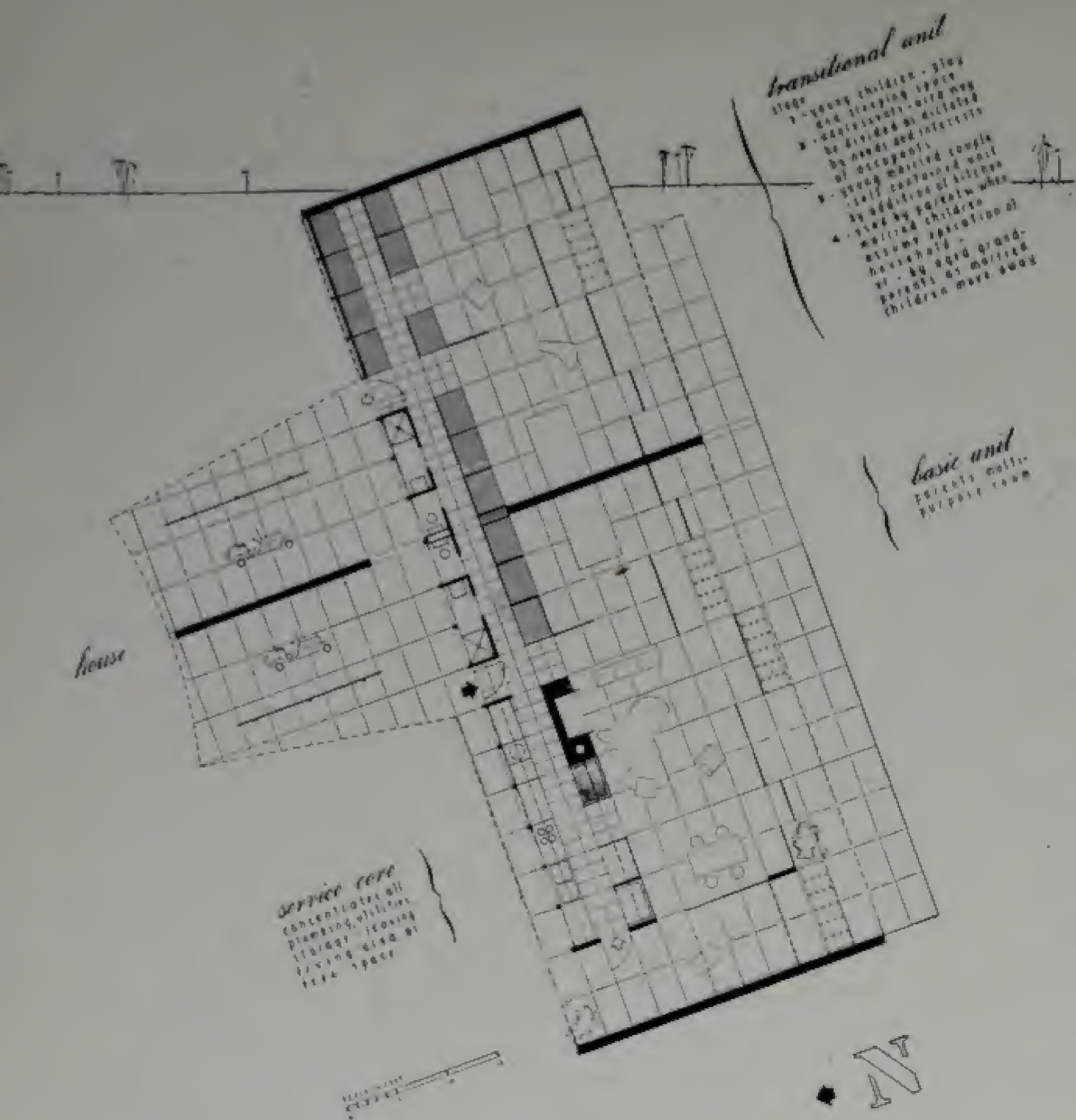


Fig. 135. H. H. Stevens, Jr., 1943

Model and construction of an airplane factory

The roof is held by compressed air, offering open space for the production of large airplanes without sight-and-movement-impeding columns



Figs. 137 a, b. © George Fred Keck, 1940

The transduo house

A house which tries to satisfy the new social trends, especially concerning family living. With the growth of the children, the function of the single units of the house may change. Therefore, it has two elements, a transitional and the basic unit. The basic unit is comprised of the parents multipurpose room and the transitional unit

covers four stages; the areas

1. for young children, a play and sleeping unit;
2. for adolescents, the area may be divided as dictated by needs and interests of occupants;
3. for young married couple, self contained unit by addition of kitchen;
4. for use by parents when married children assume operation of household, or taken over by aged grandparents when married children move away



social planning

In this country the founding of most cities was prompted not by the need for healthful dwelling conditions but by the demands of production, transportation, and distribution of commodities. Residential districts, for instance, were pushed away from rivers and lake fronts to leave the beaches for wharves, warehouses, and factories; tenements were erected on nearby company land, regardless of the smoke and grime of mills and factories. These are a few of the obvious results of an economy in which the profit motive is decisive.

At the end of the last century the wealthier part of the city population moved into the suburbs. Elevated lines were built to alleviate traffic deficiencies and to serve as transportation for the suburbanites. Garden cities were built. In most cases this brought improved and healthier living conditions as compared to the chaos of the





Fig. 138. Alvar Aalto, 1938

Row of houses for workers in Finland

This is a good example of efficient planning, simple construction, and esthetic and biological consideration of an architectural task

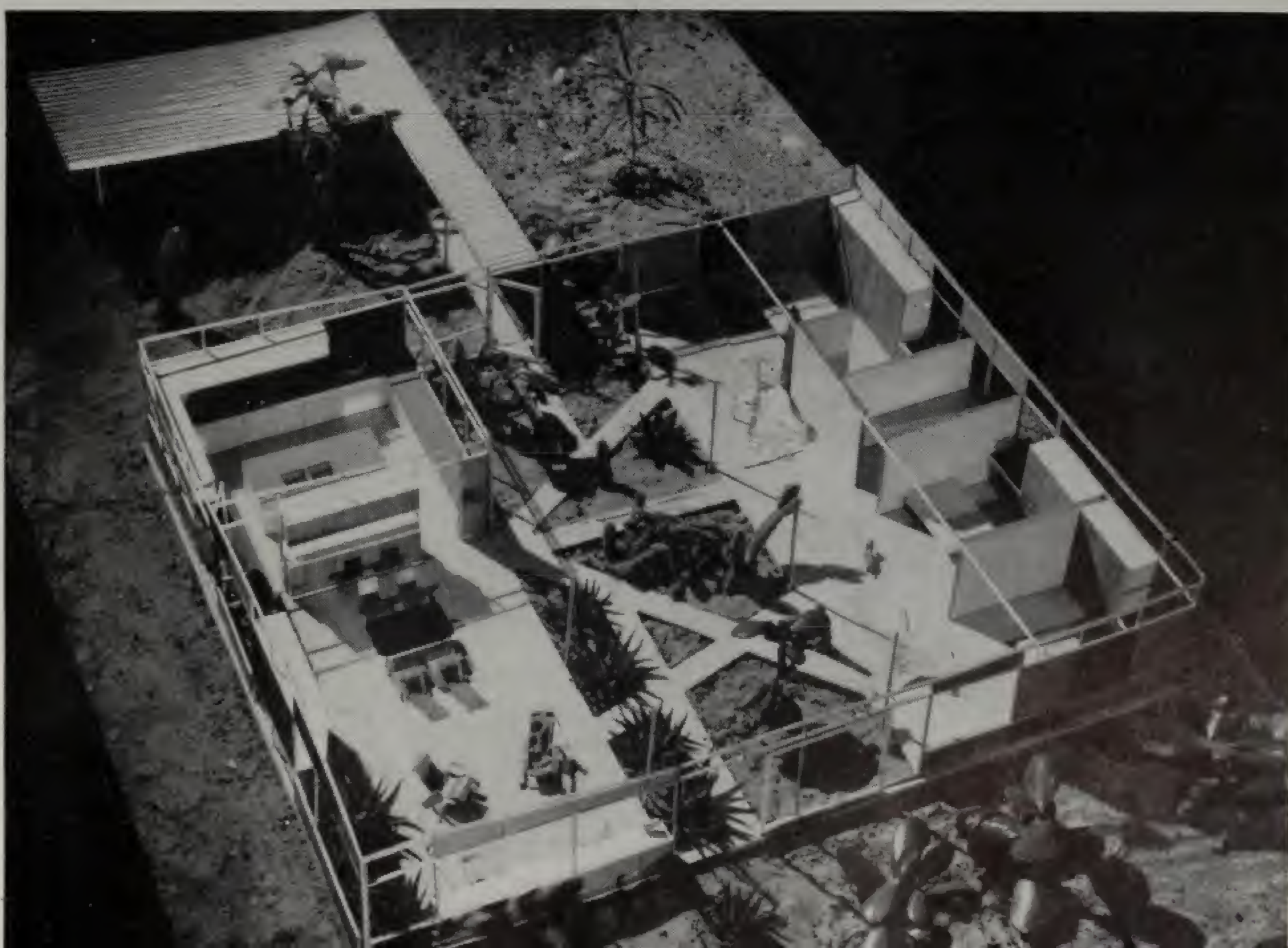
Fig. 139, a, b. ○ Ralph Rapson, 1945
Case Study house for "Arts and Architecture", Los Angeles, California
Making a house as an extension of nature and even bringing it inside. With this idea outside and inside are fused



Fig. 136. ○ Ralph Rapson and Robert Bruce Tague, 1943

The legislative palace of Ecuador (competition project)

At the beginning of the new movement in the arts, symmetry was looked upon with suspicion because its use had become mechanical. Since then, however, the principles of modern architecture have been greatly clarified and today not contemporary architecture, but the old, is on the defensive. The young architects again dare to use all means at their command, even symmetry—if the task would require such a solution



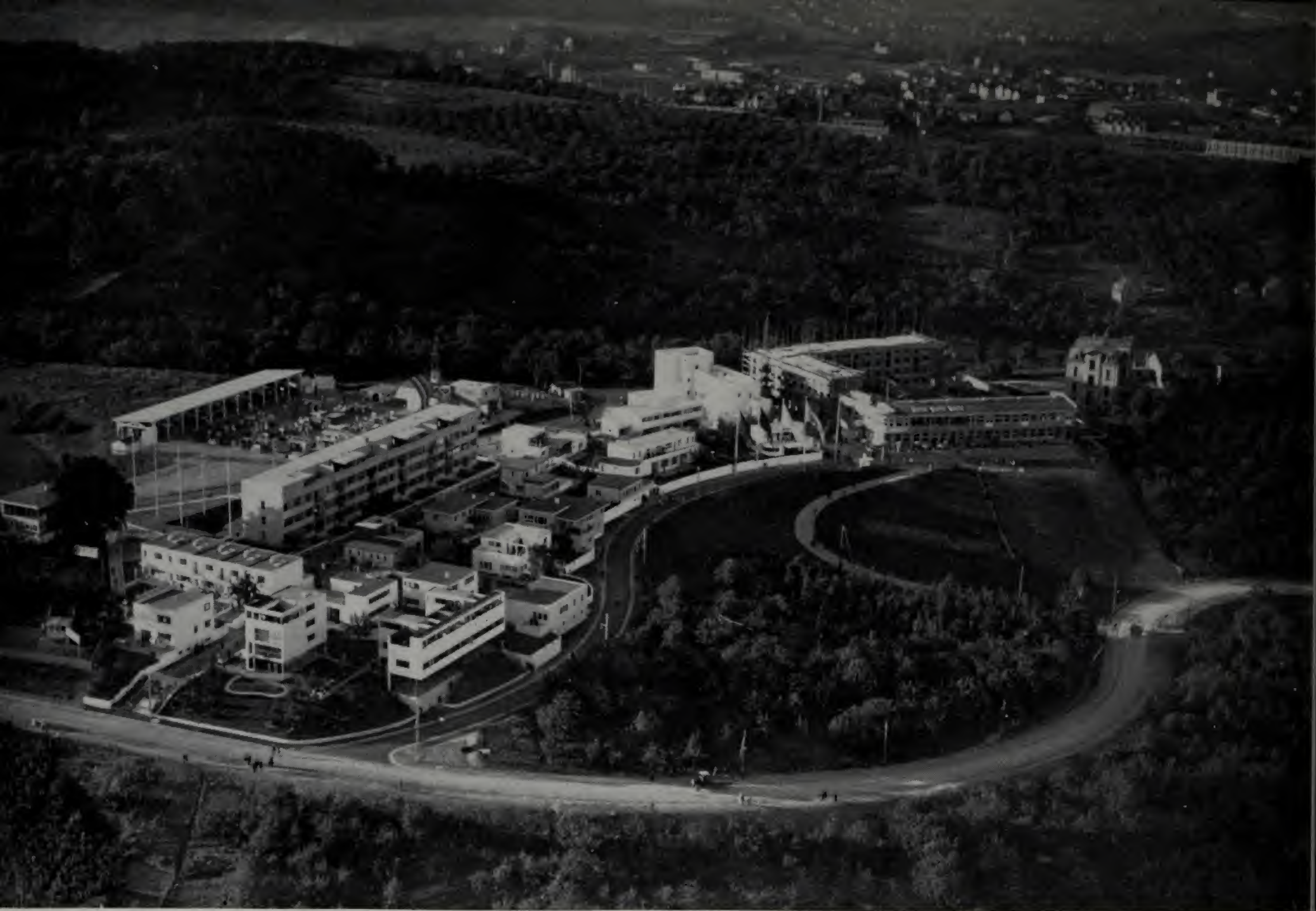


Fig. 140. Deutscher-Werkbund, 1927
Weissenhof housing project exhibition in
Stuttgart

This has been the most spectacular demonstration in the history of modern architecture. With the chief of planning, Mies van der Rohe, the best European architects—Peter Behrens, Walter Gropius, Le Corbusier, J. J. P. Oud, Mart Stam, Ludwig Hilberseimer, Bruno and Max Taut, Hans Scharoun, Adolph Rading, Victor Bourgeois, Richard Doecker, etc.—joined to erect houses for modern living

city, but caused loss of time for sleep and recreation because of tiring trips to and from factories and offices. It created that forlorn soul—the commuter. With the mass production of autos, the elevated lines became technologically obsolete but were kept on as a cheap means of intercity travel. Their structures built to solve one problem, became in turn a hazard themselves to the new auto traffic and thus produced congestion, dwarfing and darkening the streets, showering them with dirt, reverberating deafening noise—a truly anti-biological situation. In addition, the former residential areas in the city, which were vacated by the suburbanites, decayed into slums, blighted areas. These could not be rehabilitated because low-cost housing projects are unprofitable for real estate owners and the cities lacked planning and legislation to take over this task. The tax payments in the city proper dwindled. The wealthy citizen—living in the suburb—paid his usually lower tax rates in his new community while continuing to use the conveniences of the city during his working and recreation hours. The poorer taxpayer remaining in the city had to maintain the public services.

The new town planners offer help. They suggest the elimination of congestion by the planning of smaller townships on a human scale, embedded in green and connected by excellent traffic lanes with each other and with the places of work and the center of the replanned city.

But constructive town planning does not only emphasize traffic, excellent networks of highways and the elimination of crossings. Social planning is town, regional and country planning. It is planning of shelter, communication and traffic, individual and group functions, education and work, recuperation and recreation, relating the different functions of the individual and the community so that each can have the maximum benefit from the planning.

The future city will be transparent, clean, hygienic. It will be rich with the amenities of landscaping faithful to its environment. It will find better and more economical solutions to the problems of traffic, parking, heating, air conditioning, and visual and acoustic insulation. There will be better offices, factories, schools, hospitals; more stadiums, communicating continuous parks and swimming pools, playgrounds and civic centers. Such planning requires a projection of more and more elements into a well-related, well-functioning community of healthy and happy neighborhoods.

"Nature must be a daily experience, not a week-end sensation." (Gropius)

Fig. 141. O Kenneth Evertsen, 1939
Recreation and health center
Adjoining a dense population area this artificial island is suggested for Chicago's Lake Michigan



Fig. 142. Walter Gropius and Marcel Breuer, 1941

Two-story apartments, New Kensington, near Pittsburgh, Pa.

One of the best planned and executed housing projects during the second World War. Following the conditions of the rolling country, a particularly favorable and agreeable free planning originated. But in spite of obvious advantages, conservative real estate owners and landlords attacked the modern architecture itself. After great newspaper polemics and heated disputes the dwellers themselves overwhelmingly decided in favor of the buildings. Such incidents prove how difficult it is to make people understand that shapes of design originate not as a personal whim of the planner and designer but that they grow out from the given conditions—almost with the inevitability of an organic process

The TVA and Public Housing Administration of this country with its war housing program did remarkable preparatory work in bringing at least the idea of well-planned shelter to communities. Though it erected houses with unprecedented speed, and was often hampered by priority regulations, it produced results which, because of their social orientation, will leave an imprint on future housing projects. But the enlightenment of all people, including realtors and building contractors, is needed. There must be a general understanding that the individual's prosperity depends upon public welfare before a more complete planning can be realized. Slight improvements, as started recently in New York and on the Chicago lake front with parks and public beaches are only small steps toward social planning. Now, after a terrible war, we





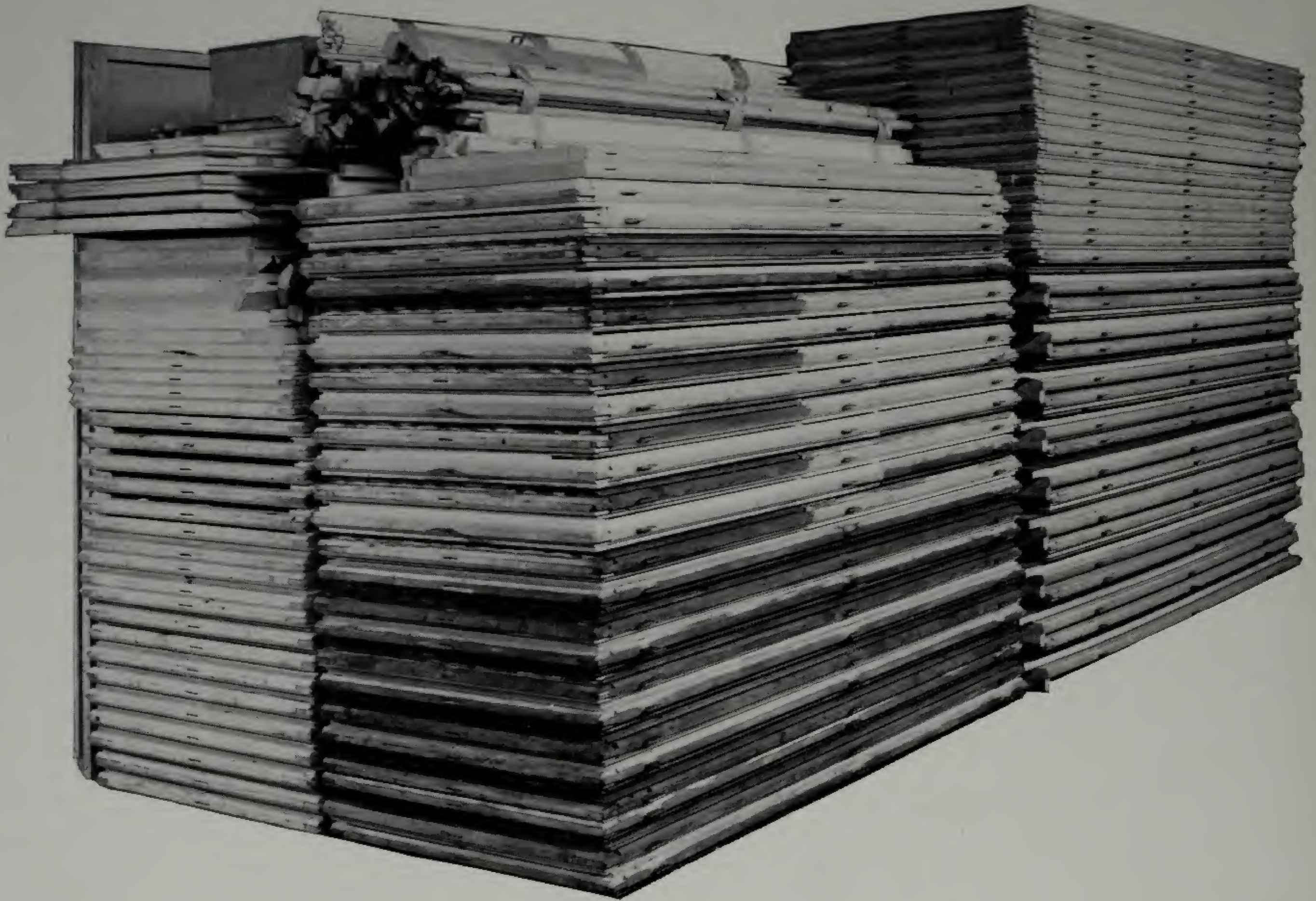
Fig. 143. Walter Gropius and Marcel Breuer, 1941

Aluminum city terrace, New Kensington near Pittsburgh, Pa.

Defense housing development of 250 units. Layout on hilly and sloping land. Community building at left, center. Family dwellings grouped in short rows of from six to eight units

have more opportunities and greater responsibilities. And it is imperative to watch the reconstruction plans of destroyed Europe. Even without the large economic means of this country, the European planners will—I believe—present the world with astonishingly positive schemes in which the human being and his personal and social welfare will be the point of departure. •

• *The Polish architects Helena and Szymon Syrkus have already advanced plans for the reconstruction of Warsaw which every planner should study. Their schemes of space articulation for the pedestrian as well as for the motorist represent a most interesting approach to town and regional planning.*

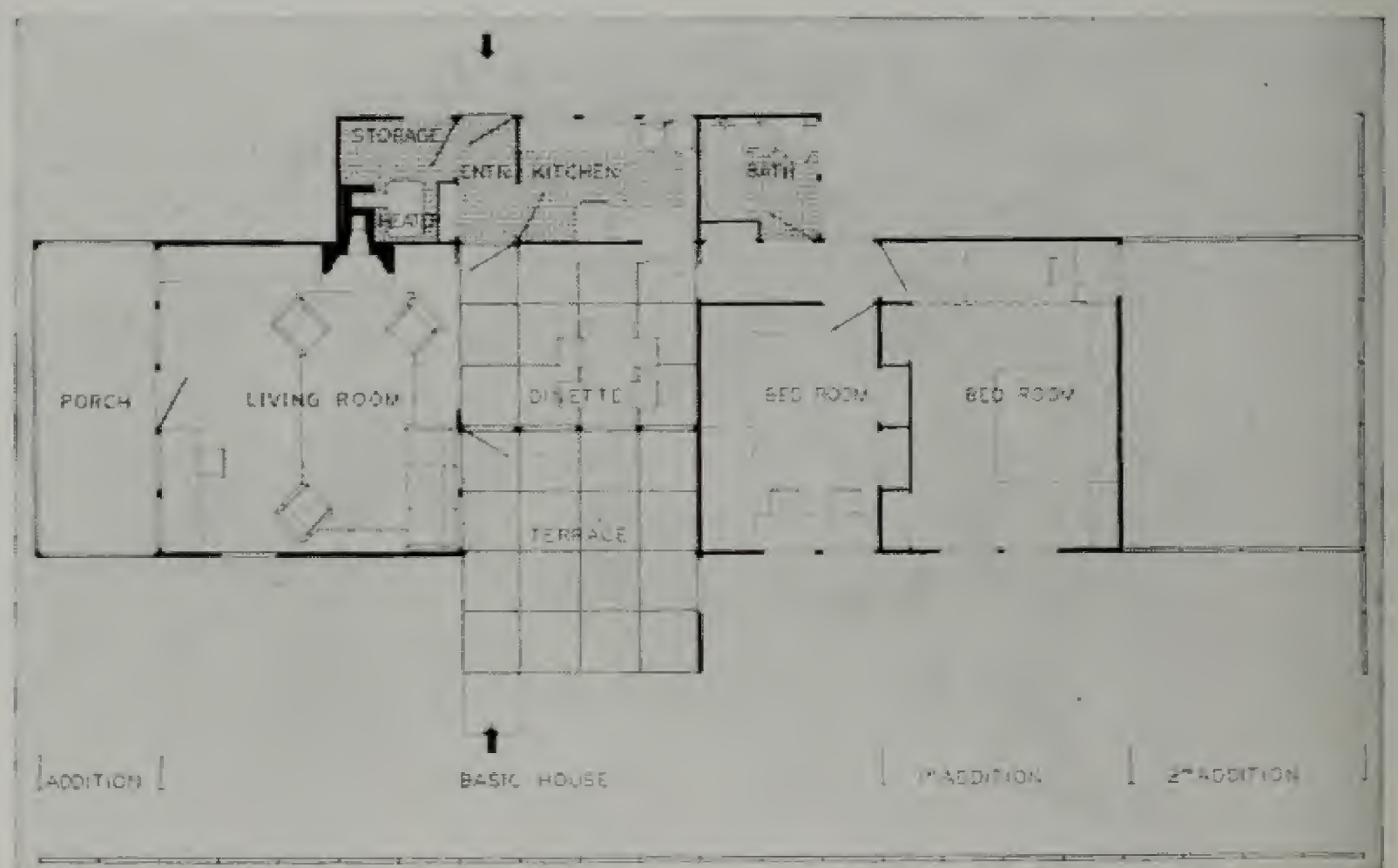


Figs. 144 a, b. Konrad Wachsmann and Walter Gropius, General Panel Corporation, New York, 1943

The packaged house

Complete parts of external shell; partitions, floors, ceilings and roof of a four-room family dwelling, prefabricated and delivered in a box, 19' x 8' x 7½'

At right is the ground plan showing the basic house with the possible additions when the family is growing



b) integration—the arts

painting

photography

sculpture

space-time problems

motion pictures

literature

group poetry

painting

One may ask, why the different chapters on the arts? The answer is simple. The special experiences in a single field may help to approach other fields of human activity as well, proving that the intuitive logic and emotional organization of human expression can transcend into a conscious organization of the whole of life.

The modern movement as manifested in the arts, architecture, and literature is between thirty and forty years old. The majority of the public is little informed of its basic principles, its main direction, and is unaware of its significance.

As to the visual arts: beginning with the last century a remarkable change took place in painting. A new space-consciousness emerged much in opposition to the cherished tradition of the renaissance painting that gave the illusion of three dimensional objects in an illusionistic space. The renaissance painter constructed the scene to be painted from an unchangeable, fixed point following the rules of the vanishing point perspective. But speeding on the roads and circling in the skies has given modern man the opportunity to see more than his renaissance predecessor. The man at the wheel sees persons and objects in quick succession, in permanent motion.

After the subtle attempts of Cézanne to create a new way of painting which would express such a vision, the avalanching power of the cubists brought forth a more accurate method. They showed the object, its elevation, plan and section on the flat canvas—as if it would be seen from many viewpoints, in motion, revolving before the eyes of the spectator. This could have been considered merely as an improvement in the art of rendering. But then a mutation occurred: The abstract artists, the neo-plasticists, suprematists, and constructivists discovered that in the efforts of the cubists

not so much the representation of objects and the description of their motion was the most important feature but the visual force and emotional wealth of relationships, the constructive potential of the visual fundamentals.

This development of the visual arts from fixed perspective to "vision in motion" is vision in relationships. The fixed viewpoint, the isolated handling of problems as a norm is rejected and replaced by a flexible approach, by seeing matters in a constantly changing moving field of mutual relationships. This may start a new phase in the history of mankind, based upon the universal principle of relationships. It is the clue to all the changes which took or will take place in the sciences as well as in philosophy, including education and all other fields, in fact, in our whole civilization.

issues•

An analysis of contemporary painting should be valuable in helping to overcome emotional illiteracy and isolation. It also helps to lessen the prevalent fear that the new art is unintelligible. This fear is destructive since it often creates hostility thus robbing the individual of the pleasure of taking part in the vital processes of art.

Depending upon their previous experience and knowledge, some onlookers have a predetermined expectation of "art," a signal reaction, as the general semantists put it. They do not realize that the great painter communicates with nothing else but the common language of art based upon visual fundamentals. They do not realize that the personal ways of using and interpreting these elements constitute the idiom of the artist and that such an idiom usually has a simple system by which understanding of a work of art can be brought about. When such systems are explained and made transparent, much of the spirit at work can be recaptured. However, it must never be forgotten that verbalization can show only a limited scope of art and, segregated from emotional experience, it can sometimes lead away from the real meaning rather than toward it.

Intellectual grasp has to be coordinated with the emotional. The spectator must be prepared to sense the underlying meaning of the artist's approach not as a "verbalizable," but mainly as a passionate visual message about actual problems of his time.

A school's duty is to sensitise the student to advanced thought and artistic expression.

In the Institute, the student is incessantly confronted with contemporary art and through exercises encouraged to participate in its problems.

●
Besides complicated social and economic issues, there appeared at the end of the 19th century two great complex areas of human experience. The one was vision in motion; the other, the discovery that the subconscious is a part of the organic function of the human being. Both concepts are actually different sides of the same problem, that is space-time. The one belongs to the physical, the other to the psychological sphere. In manipulating, measuring and experiencing our physical and psychological environment space-time is an *added dimension*, a refinement of our tools in grasping our environment and ourselves within.

• See also chapter "space-time," pages 244-269.

On one level, space-time is only a physical measure as are length, breadth and thickness with which man has been so long familiar. And as with all profound insight, it is seeping into the whole of our culture, that is, *on a second level*, space-time is the way in which we envisage feelings and psychological events. It is in term of the cultural lag of this physical and emotional insight that much of the violent reaction against the newness and "unintelligibility" of modern art can be properly understood.

●

We can apply the physical space-time to matters old and new which we habitually define in other terms. Peeling an apple, for example, and laying the skin flat on the table gives us a two dimensional space-time diagram epitomizing the essentially three dimensional rotation of the apple and the essentially three dimensional journey of the knife blade around it.

The "Statesman's Yearbook," with its multifold tables of statistics is a compilation of space-time diagrams composed of numbers rather than apple peelings. The statistics of the movement of wool from Australia to New England over a decade are an exact expression of a rather complicated manoeuvre in quantitative and time combinations. ●

Your hand *in itself* is a space-time diagram! The painter who intends to render the hand truly in all its aspects of growth would properly have to start with the first fertilized cell, continuing with the embryonic hand through all its stages to its present status. The solution for such a rendering problem would be, of course, not the obvious juxtaposition of the single stages but a synthesis of the space-time aspects.

When such a rendering is achieved, the spectator himself will mentally recreate the process of growth; and in doing so, he is exercising vision in motion. The rendering itself is, as in any space-time diagram, motion arrested for vision. Whether one studies statistics or looks at the space-time rendering of the hand, his contribution is to unfreeze the sign language of vision and recreate the motion. Later, after he liberates himself from traditional vision, he will be able to apprehend this *emotionally as well as intellectually*; see it, feel it, know it. Once he has achieved this power he will have broken past the isolation of things to a deeper and richer unity of insight.

Through the use of this psychological insight and the psychoanalysis of Sigmund Freud, space-time fundamentals may be understood also as the syntax and grammar of an emotional language which may re-create the path of the inner motion. This can express the problems of living (through the arts) more directly and synchronously in their totality than could be done by any mere descriptive version. And as people have to learn to read and relate the manifold signs of traffic control at metropolitan street intersections for physical safety, they must learn also to read and relate the emotional meaning of the expressive fundamentals used in the different arts in order to avoid the danger zones of psychological "intersections."

● *It is to be expected that statistical material and similar problems of visualization will be better handled in the future when we appreciate the technique of pictorial rendering of motion. Notable efforts were made in this direction by Otto Neurath (Oxford) and by the use of photomontage.*



Fig. 145. Pablo Picasso, 1943
Still life

Though a late work of Picasso, it demonstrates clearly the pre-cubist principle of "distortion", signifying a composite view of the objects

From Giotto to Cézanne every painter has assured the spectator that his rendering of nature is without "distortion". But this was only a pious wish since a draftsman always has to simplify his subject when he translates it into linear form. And the painter has to interpret the objects in colors; has to leave out details; has to set a dark object into a light surrounding and a light object into a dark one if he wishes to emphasize them. By these subtle manipulations the painter "distorts".

If the painter feels that in a still life a changed relationship of objects would improve his composition, he—of course—changes the position of those objects and no one would complain. But the common belief is that such a rearrangement should not be allowed in the case of that sacrosanct—the human body. But after all, face lifting and beauty surgery are commonly practiced today and one should not wonder that the painter may desire—for a more expressive purpose—those privileges of the surgeon. There is only a shade of difference between "distortion" of a color scheme and of actual parts of the human face, or other such "immutables".

The recognition of these problems is still difficult for very few have as yet the proper attitude for it. But because the idea of vision in motion and the subconscious relationships have far-reaching implications, every creative worker in his field willy-nilly tries to find the means for their exposition.

cubism

Cubism, without being entirely conscious of its role, became a potent instrument in this process of indoctrination. Like Einstein in physics, Freud in psychoanalysis, the cubist painters had a tremendous impact. Their work introduced a whole new outlook.

Cubism is "vision in motion," a new essay at two-dimensional rendering of rotated objects.

An analysis of cubism can best start with the paintings of Cézanne. By leaving out of his pictures the nonessentials, a device which characterizes his aquarelles and especially his so-called "unfinished" canvases, he demonstrated a kind of scientific inquiry into painting—the precise observation of visual elements like "isolated cultures" in a biological test tube. Cézanne tried to say with less more than his predecessors had said previously with much.

The effort to show only the essentials was carried further by the early cubists in stereometrizing of the objects. (Yet Cézanne had prepared even for this development by stating that the painter who can paint a sphere, cylinder and cone, can paint everything.) The bizarre name "cubism" originated with some Braque and Picasso landscapes which did not show too much deviation from nature, except that windows and doors were left out of buildings. The resulting shapes were rather cube-like, hence the name. The attitude in these landscapes toward light was more remarkable than the prismatic simplification of the shapes. Contrary to what had been done in the past, these pictures did not follow the natural conditions of lighting but deliberately used light and shadow effects, a kind of shading, in order to define the objects in a geometric clarity. The "cubist" painter was more interested in rendering the objects in the most economical way than in the light and shadow relationships as determined by the casual position of the sun. With that he became independent of the servile type of observation to which, for example, the documentary photographer was subordinated. Photographic emulsion rendered shadow and light exactly at the spots where they appeared at the time of the exposure, but the cubist carried through the task of rendering without any consideration of such accidental circumstances. He rendered the object in its *true* nature, in its totality. With this, he unbound himself from the dictates of naturalistic renderings; from the pressure of conventional, repetitive, and imitative demands to a growing consciousness of the autonomous interpreting power of the artist. •

• As a young boy Alexander Kostellow, a Persian artist, now Professor at Pratt Institute, went to Paris in order to learn to draw and paint. When he returned to Persia his teacher there asked him to draw a bird. He did it as he had learned in Europe. The teacher reprimanded him: "Do you know that, to draw something as it is, is very vulgar?"



Fig. 146. A. E. Brinkman, 1930
The south cross nave of the monastery church in Ottobeuren
This is a composite view produced by assembled perspectives in depth and height. The photograph re-creates the movement of the eyes as they wander from the benches upward to the ceiling



Fig. 147. Paul Cézanne, 1903
Still life
Observe the peculiar distortion of the jug, which bulges more on the right side than on the left. The same is true of the bottle

The next step in the development of cubism was the bird's-eye view, giving a more inclusive vista. To see an object frontally means to see it in elevation. From above not only the elevation can be seen, but also the plan and some of the sides. Also from above, the original shapes are seen with greater clarity than in the central-perspective-vistas and vanishing point renderings which distort the real proportions. One sees "truer". Instead of an egg shape one sees the undistorted sphere; instead of an oval, the circle. •

This attempt at better and more perfect rendering was only a preliminary step. Suddenly, the view from above changed into a view from everywhere.

The classical rendering on the static plane, on the painted surface, showed only one aspect, one view. But in reality objects can be seen from the front, profile, three-quarter profile, and from the back. A person is really defined in his three-dimensionality when he is seen from every angle. This definition can be accomplished either by turning the person or moving around him. Cézanne already indicated this problem. He painted objects in the very same painting from different viewpoints: the one from above, the other frontally, the third from the side. He painted also a bottle, for example, in a peculiar distortion which can be explained as a composite view, that is, seen simultaneously from the front and side. ••

• *Photography, which had indirectly given impetus to early cubism, later learned from it. In the twenties it started to favor bird's, frog's, and fish's-eye views. It even tried to give up the traditional horizon line because it cut the object in undesirable ways. Casual horizon lines caused confusion. They rarely contribute to a better explanation of the object. Today, photographs often are taken from above on an inclined surface or against a curved background, eliminating the horizon line. This allows a concentration on the object itself which no longer is cut haphazardly. Also, the contemporary photographer uses any number of light sources at various angles if they help him define his object better. Interesting enough the old-timers—"the sun-worshippers"—violently oppose such a step.*

•• *For a long time this treatment was only interpreted as a kind of expressionistic distortion. At the writing of "the new vision" (1925-1928) I was not yet able to comment on this aspect of "distortion."*

Fig. 148. In front of the Depot, St. Anton, 1935

This picture (a fish-eye view) was taken with a Robin Hill camera, which has a wide angle lens of 180 degrees
In the second World War, the fish-eye view became especially important in the cartography of large territories



Fig. 149. O. Milton Halbe, 1942
Head, multiviewed





Fig. 150. Gaetano Chiaverri, 1738-1746
Hofkirche in Dresden; sculpture on the roof

In order to make the saints appear mightier from below, the proportions were distorted, the base made very large and the head very small. This enhanced the perspective-effect!

distortion

Some distortions have a corrective, illusionistic function as in paintings or sculptures placed high on buildings. (The stone figures of saints mounted on the roof of the Hofkirche in Dresden was deliberately distorted. This "distortion" was only calculated to eliminate distortion, to make them appear tall when viewed from below.) But distortion usually has literary or plastic meaning. Sometimes the two are integrated. Distortion with plastic meaning strives for visual enrichment as in frog and fish-eye views. Plastic distortions may overemphasize dimension and proportion, depth, width, length, concave, convex, geometric and free shapes. Literary distortion (in the visual arts) counts on the intellectual shock deliberately produced for a more expressive characterization of objects and persons, as in caricature or visual pun, for instance showing a man's chest as a chest of drawers. Because the suggestive plastic meaning of distortions is very strong, paintings of an exalted, delirious character often employed anatomically false placing of extremities and organs without endangering the plastic unity of the work. On the contrary, the purpose of such an action was precisely to create a peculiar entity.

Cézanne's desire to bring the objects more truthfully to the spectator led him to choose the most revealing viewpoint in the very same painting, from above, from the side, from below, as it best suited the discrimination of the single object. The result was a *composite view*, a "distortion" if judged within the convention of the vanishing point central perspective, but in reality it was *vision in motion* (rendered on the picture plane).

We may thus say that distortion equals motion because what we generally call "distortion" is only distortion in relation to the fixed perspective of the renaissance painter.

Distortion can then be understood—in addition to its other meanings—as space-time synonym. The illustration, "Parallel", is photographic proof of this statement. The little squares of the mosaic tiles at the bottom of the swimming pool record exactly the *motion* (waves) of the water surface through a thousandfold variety.

Following Cézanne, the cubists changed the static and arrested monocular vision of the renaissance to binocular vision—vision in motion. • In the very early as well as the later cubist paintings the familiar pitcher, glass, pipe, violin, etc., appeared more distorted than in the paintings of Cézanne. Their composite views were unusual renderings showing the object mainly from two sides, from above and in one of the elevations. By juxtaposing or mingling these views, the result was a composite object appearing for the uninitiated as a "distortion" (within the convention of the fixed

• Cézanne once declared that by moving his head slightly to the left or right, while standing on the same spot, he could paint a great number of different pictures; that is, his method of painting was from a fixed position, without motion of the eye—monocular. Later, toward the end of his life, he apparently gave up the rigid classical viewpoint and tried to "embrace" the object with both eyes, especially—as we saw—by shifting his position of observation in the same painting. This anticipated the visual situation of the driver at the wheel of the speeding car or plane. There the motion automatically produces a "binocular" vision even if the driver, paradoxically, had but one eye.



Fig. 151. O Gladys Rabung, 1944
Study of deformation
(two prints of the same photograph combined)

Fig. 152. O Hattula Moholy-Nagy (age eleven), 1945
Compression
(from the Institute of Design's Children's class)

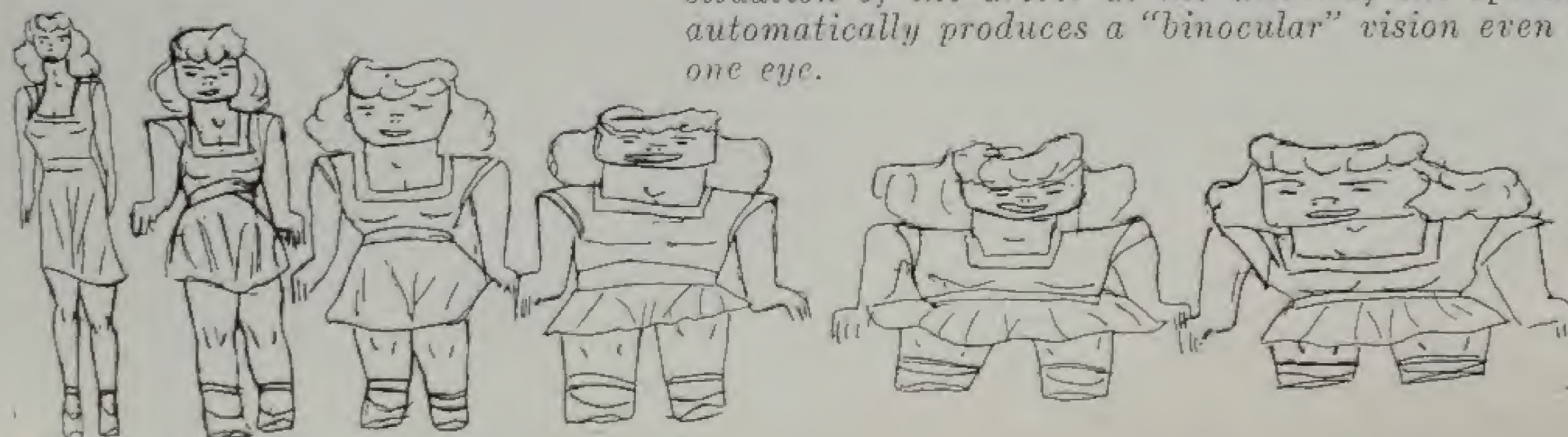


Fig. 153. Ryuji Sibata, 1937
"Parallel"

This illustration is a photographic proof of the statement that "distortion may mean vision in motion". The little squares of the mosaic tiles at the bottom of the swimming pool record exactly the motion (waves) of the water surface in rich variety

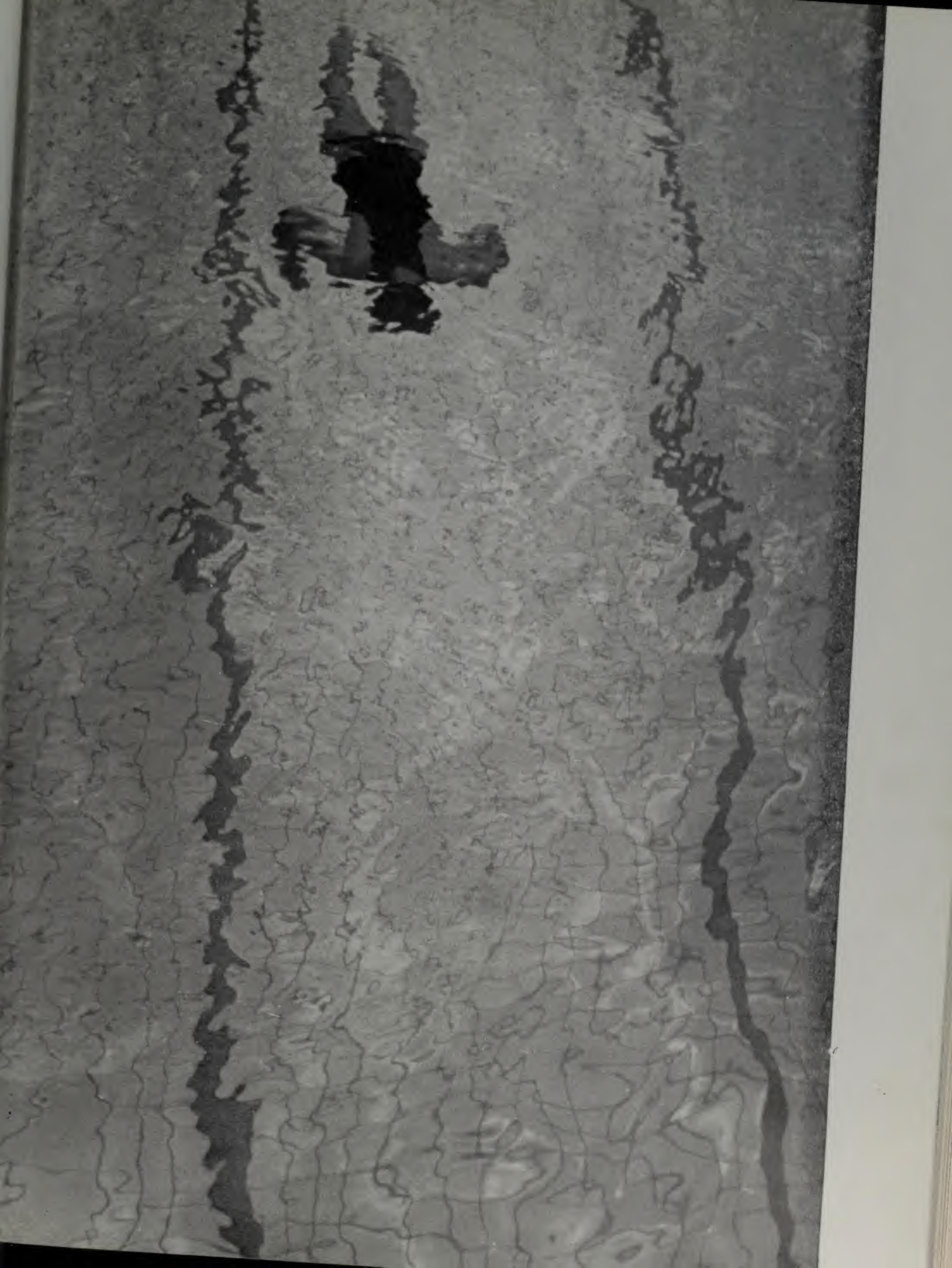




Fig. 154. Hans Memling, 1433-1494

The martyrdom of Christ

Action continuity. Starting in the top left-hand corner, the various episodes of the last days of Jesus Christ are arranged roughly in the form of a "w", finishing with the crucifixion at the top on the right

vanishing point perspective). In reality, the process was *vision in motion* (rendered on the picture plane). Its practical consequence was a revision of our visual perception.

attempts of rendering motion

Attempts to represent motion or its path have been made previously. The 14th century illustrations of the scene at Golgotha were painted as a spiralling road on a hill with Christ carrying the cross not only in one, but in *all* the stages of his Calvary. His figure appears a number of times on the one canvas, simultaneously juxtaposing the different phases of his movements. The ascending road in this type of painting denoted not only the place of his suffering but its time measure as well.

Another version of vision in motion is the drawing showing Dante and Virgil visiting purgatory. The figures move from right to left and can be seen in different positions at different places, listening to the sinners. Such a motion rendering is very similar to the visual synopsis of an animated cartoon. The main motives of the film are



Fig. 155. Edvard Munch, 1895

"Tingle-tangle" (lithograph)

Attempts at recording motion are not new. This drawing done so long ago shows different phases of the lifting of the dancer's leg

rendered first; then the gaps are filled in for the final production. This method is adopted from the comics, which are essentially the static predecessors of motion pictures. They are popular with children as well as grownups of a primitive emotional and cognitive existence. They tell stories visually, giving adventure and action on the crude level of actuality without philosophic or reflective content.

A rendering of vision in motion is given also in photographs of fireworks, in the diagram of the continuous flight of a skywriting plane; in the motion photos of Muybridge as well as in industrial time and motion studies. These representations produce visual synopsis which engenders a simultaneity of grasp. Cubism, futurism, photo-montage, superimposed photographs, stroboscopic exposures and scientific graphs pave the way for this new type of communication. They are but a beginning in the perfection of visual "manuscripts" which will be read more quickly and precisely than verbal ones and will express some things which the word, in its nature, never can.

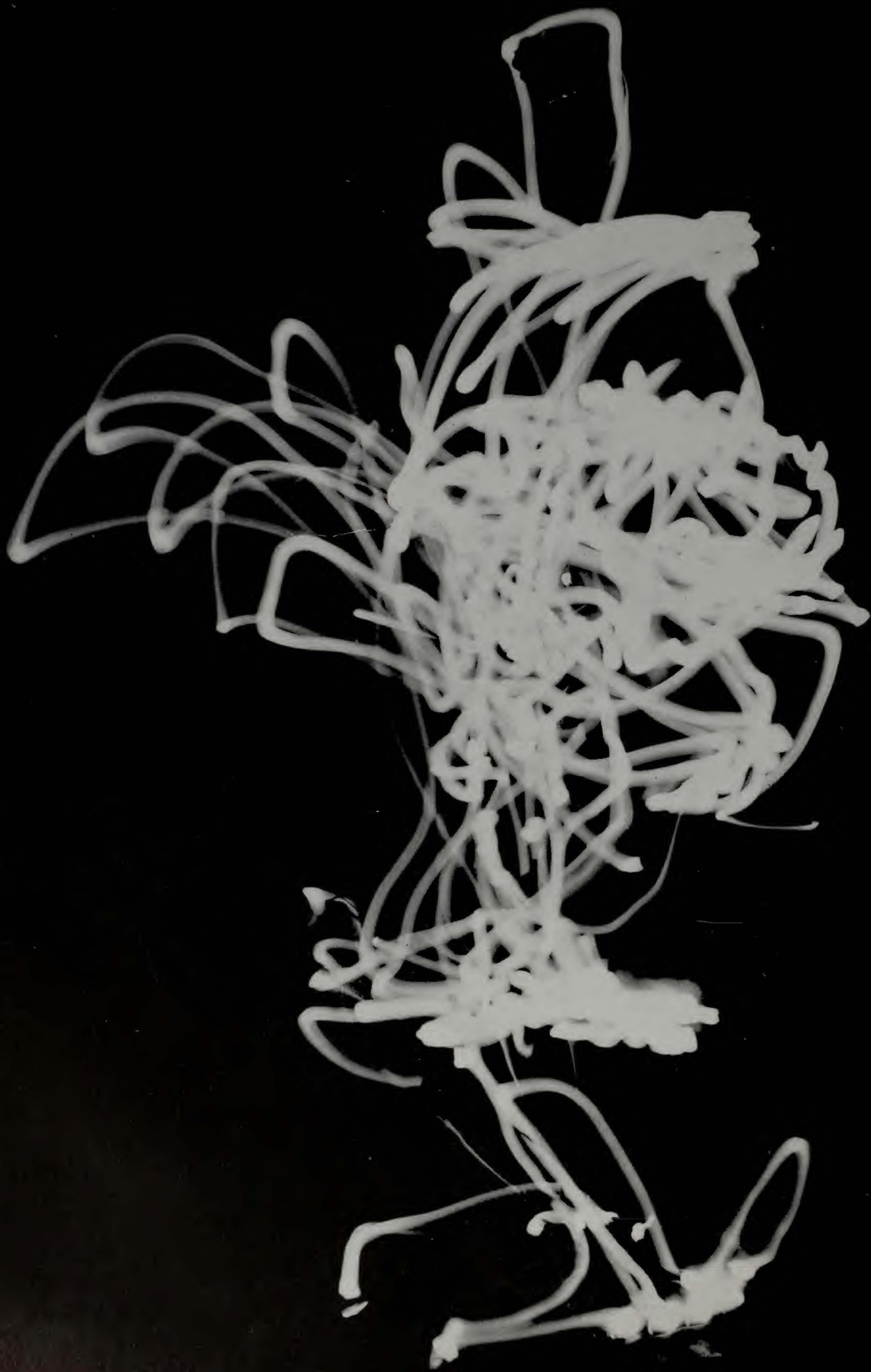
Every pictorial rendering is an abstraction to be retranslated into its original meaning. People have to be educated in deciphering and understanding them, just as they are taught to read and write. A photograph is generally understood as a facsimile of an object. Nevertheless it might be well to remember that even a photograph could not be "read" unless one had learned how to approach it, to retranslate its black and white and gray gradations on the flat plane into the original three-dimensional scene. In days to come, when more science and technology will be introduced in the daily routine, there will be more need for space-time rendering and their punctilious interpretation.

the system of cubism

Around 1910 the means of such an approach were yet rather inarticulate. The cubists tried again and again to pose the problem and give a solution. One of their most successful discoveries was the presentation of the object or person in motion from every viewpoint as if revolved and rotated before the spectator. The idea was natural and simple, but its convincing execution took years. The history of cubism is the sum of the efforts at solving this problem. Each cubist painter brought his personal findings into this multi-view system which, though intuitive, can be described and analyzed today.

The solution for a simultaneous vista was to superimpose these various views, each over the other.* The problem of legibility, however, arose. The solution was sought in visual fundamentals—bringing discrimination, order, definition, separation to the many and chaotic details which occurred when various views were superimposed. Again, as with the varied approaches to the multiple view, the main lines of the cubist system can be found in the individual attempts to attain maximum legibility.

* *The superimposition of different views into one homogeneous unit has long been a standard practice of cabinet makers. Their working drawings are superimposed over each other, the plan, the elevation and the section of the furniture piece to be built.*



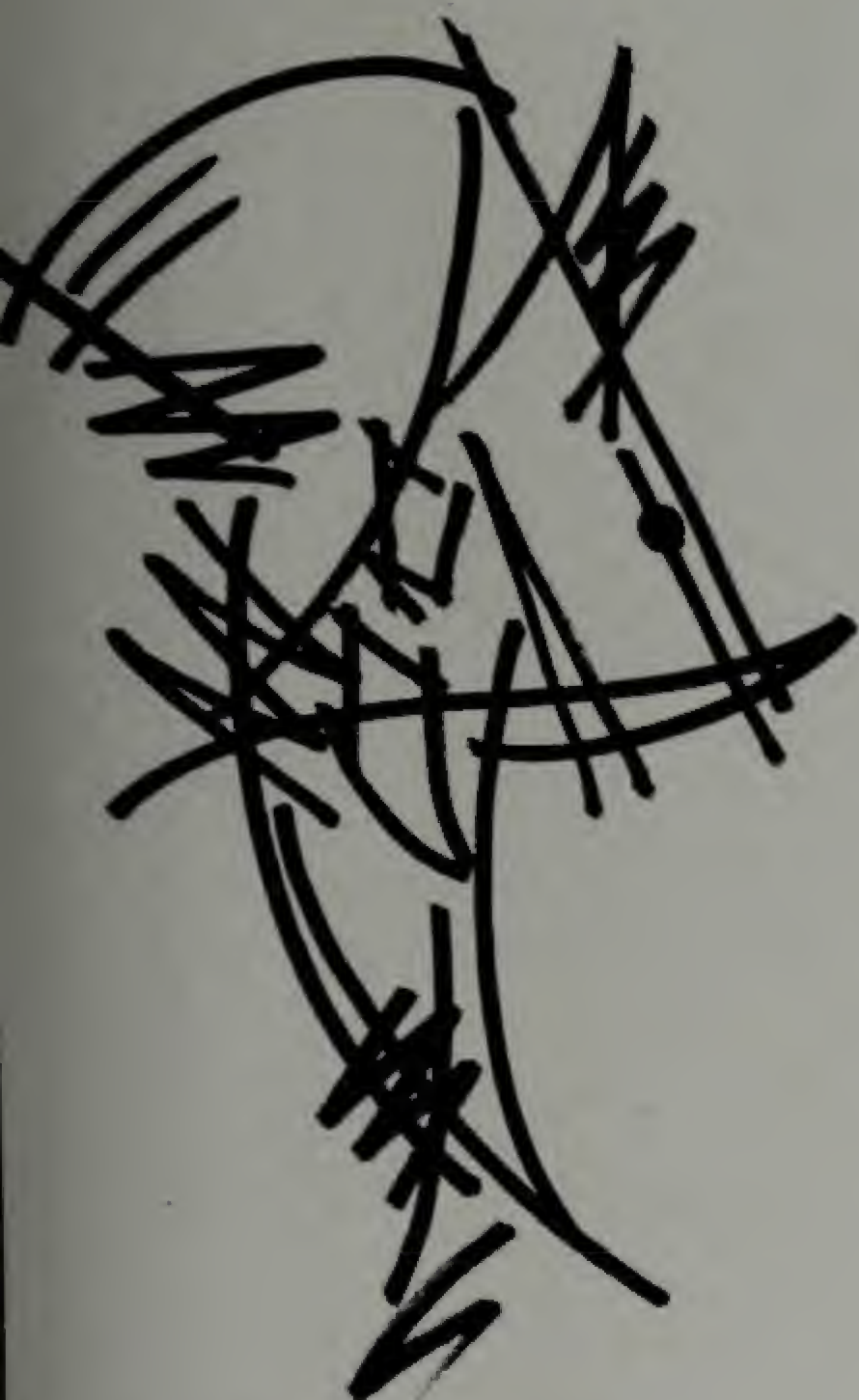


Fig. 157. Jim Davis, 1945
Path of motion
An almost identical line composition as
Fig. 156



Fig. 156. Herbert Matter, 1944
Man dressing (side view)
Motion study with lights fastened on the
body of a man changing clothes. Such
motion studies introduced by Taylor and
Gilbreth, have been a new departure for
industrial improvements by study and
elimination of the superfluous

Fig. 158. O Millie Goldsholl, 1943
Positive—negative
Photograph of a mirror from which the
silver was scratched off in the shape of
curving lines. (The black surface with the
white lines is the shadow cast by the mir-
ror)



visual fundamentals

The eyes react to visual expression because its elements affect physiological and psychological perception. After some experience, it is possible to discriminate between such elements and thus use them more skillfully and consciously in order to create a stronger emotional impact upon the spectator. It is never the object itself, not even the actual fragments used in the cubist collages, which affect the spectator, but their direct and pure visual meaning and their combination into a coherent visual order. This visual order has a biological foundation. It is more an unconscious than a conscious affair.

On the flat plane, in painting and photography, visual fundamentals are as valid as they are in sculpture and architecture and with certain modification in mobiles, dance, theater, and cinema.

Cézanne and the cubist painters organized their work through visual fundamentals to affect the spectator instantaneously or to slow down his reactions, as with a time fuse. Composition was the means with which they accomplished this and composition was achieved through relationship of the visual fundamentals projecting the content in the most economical way.

The visual fundamentals emphasized by the cubists were based mainly on contrasts:

<i>black and white</i>	<i>full and empty</i>
<i>dark and light</i>	<i>perforated and solid</i>
<i>geometric and free shapes</i>	<i>curved and straight</i>
<i>complementary colors</i>	<i>convex and concave</i>
<i>positive and negative</i>	<i>distorted and unchanged;</i>

positions with contrasting relationships,
points—lines—planes—bodies;

directions,

<i>horizontal</i>	<i>oblique</i>
<i>vertical</i>	<i>converging and diverging;</i>

shifting,

<i>one shape from another</i>	<i>halves from each other;</i>
-------------------------------	--------------------------------

textures (materials),

<i>rough and smooth</i>	<i>instead of brushed, combed color</i>
<i>shiny and dull</i>	<i>color mixed with sand and graphite</i>
<i>shaded and clear</i>	<i>collage;</i>

plastic effects developed from the nature of color, plane and line as opposed to artificial illusions,

<i>psychological after-images</i>	<i>warm and cold color</i>
	<i>receding and advancing color.</i>

solutions of legibility

The cubists instinctively felt that their main difficulty was to overcome an apparent confusion accompanying the use of superimpositions. This stimulated them to a number of solutions which had a marvellous range of optical wit, a richness of pictorial ingenuity, an accomplished use of the brush and pigment. Though many of these attempts to disentangle the confusion of superimposed views were seemingly independent of any tradition, the performances often were based upon previous formal findings. (Even cubism had to build on the work of its predecessors.)

Shading, for example, one of the most important of the cubist means, has for ages been employed for exact definition and visual discrimination. Darkening the background around it lifted the object out of the vacuum. By using arbitrary shading and light, the cubists brought clarity into the superimposed elevation, plan, section, profile, and three-quarter profile. This was, at least, their intention. But in the process of realization the idea shifted to a fireworks of visual imagery. The diligent shading of small prisms, cubes, spheres, and segments produced a spatial kaleidoscope of intense vibration, dark and light relationships which turned out to be almost a preconception of the photogram, the cameraless photography.

Later, textures (woody, sandy, glossy) were added to the shading. They helped to attain better legibility. Then, real material values came (in the "collages"), bits and ends pasted, glued directly on the surface. This was followed by a rich and arbitrary use of colors and new types of "pattern"—all for clarity, greater discrimination of the parts and the whole.

As for the deliberate free shading, there is an early, rather naturalistic still life by Braque, where the idea of separating and defining objects has been skillfully accomplished. The painting depicts a chess board and playing cards. Ordinarily, one card lying over another does not cast a shadow since it is too thin. But without shadow, painted cards could not be very well discriminated. To get a definition and a contrast, Braque raised and twisted them so that they cast unusually large shadows. With this he achieved two results: first, discrimination; second, vision in motion.

This painting is revealing in another way, too. It is a vision of the tendencies introduced in the third phase of cubism, when stereometry was replaced by a complete dissolution of the three-dimensional objects into flat planes, especially in collages. The most important part of this playing card still life by Braque is the lower half of the painting. There the naturalistic departure cannot be any more identified. Why did Braque paint these lines, light and dark surfaces, which seem to divide the area into little space cells? There is no apparent reason, except the urge to follow freely the subconscious dynamics of visual fundamentals produced by the interesting rhythm of the cards and their large shadows. Braque started out to paint the objects, cards and chess board, but he unexpectedly arrived at an autonomous visual structure little bound to nature but rich in an inherent quality for releasing emotional reactions.

This analysis of Braque's still life should not be taken too literally. The painter was



Fig. 159. Robert Delauney, 1931
Simultaneous composition
Delauney was the first among the cubists to use the primary colors as important elements of his compositions



Fig. 160. George Braque, 1909
Still life: Chessboard and playing cards



Fig. 161. O Institute of Design, 1942
Students work demonstrating the method
of cubism
From the left to the right: texture, shading,
shifting, color, and revolving the object in
space. The third drawing from the right is
enlarged in fig. 162

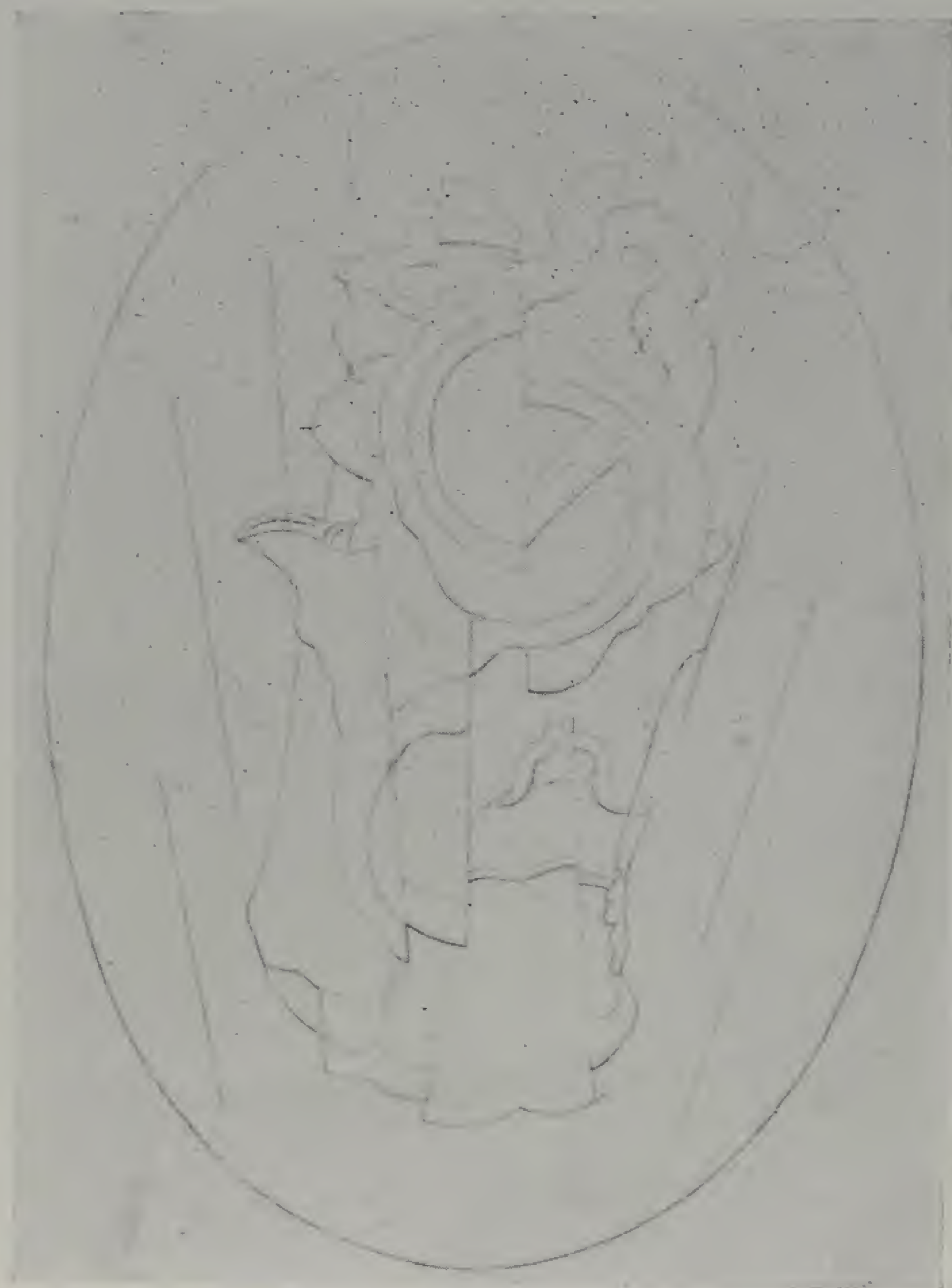


Fig. 162. O Harry Sparrow Powell, 1943
Coffee pot
Study of side, front, bird's-eye view, and
section of the pot (see above on the panel)
synthesized in a composite picture of the
cubist system



Fig. 163. Jacques Louis David, 1748-1825
Portrait of Mlle. Charlotte Duval D'Ognes

hardly aware of his intentions as they are here stated. He painted with the instinct and passion of a rebel, with an inspiration which cannot be adequately verbalized. But while he fought with tradition, the painting is not yet a complete rejection of perspective. Though he may have been influenced by subconscious directions, hunches and guesses, though he may have thought to employ his own means according to *his* needs, his attempts had been prepared for by his predecessors. Braque, in dissolving the objects into planes, only followed a historic trend, a long line of ancestry.

There is, for instance, a David picture from the time of the French revolution.* A girl is sitting in a salon, behind her a glass door. One of the panes is broken as if a Jacobin had thrown a stone through it. This is but a literary explanation. The real revolution in the painting is the attempt to omit the classical, converging line perspective. The painting is organized mainly in planes placed one behind the other. The girl is in front, behind her is the glass door and behind that, parallel with the door, a high wall. As a slight reminder of the old perspective some buildings appear on the right, looking more like an elevation than a perspective rendering.

This method of slipping planes, each behind the other, became standard for spatial articulation in the 19th century, in painting as well as in architecture. But in painting the main emphasis was still on subject matter, on the illusion of object and landscape. In cubism the same spatial arrangement is used for the first time more purely, with little complication by the subject matter.

• *In the Metropolitan Museum, New York*

Fig. 164. George Braque, 1928
Still life with knife



Fig. 165. George Braque, 1914
Still life

Braque in this picture uses the whole vocabulary of cubism: shading, shifting, line, plane, texture and color—including the free shape instead of the oval, which received later such great attention, especially in the work of Arp

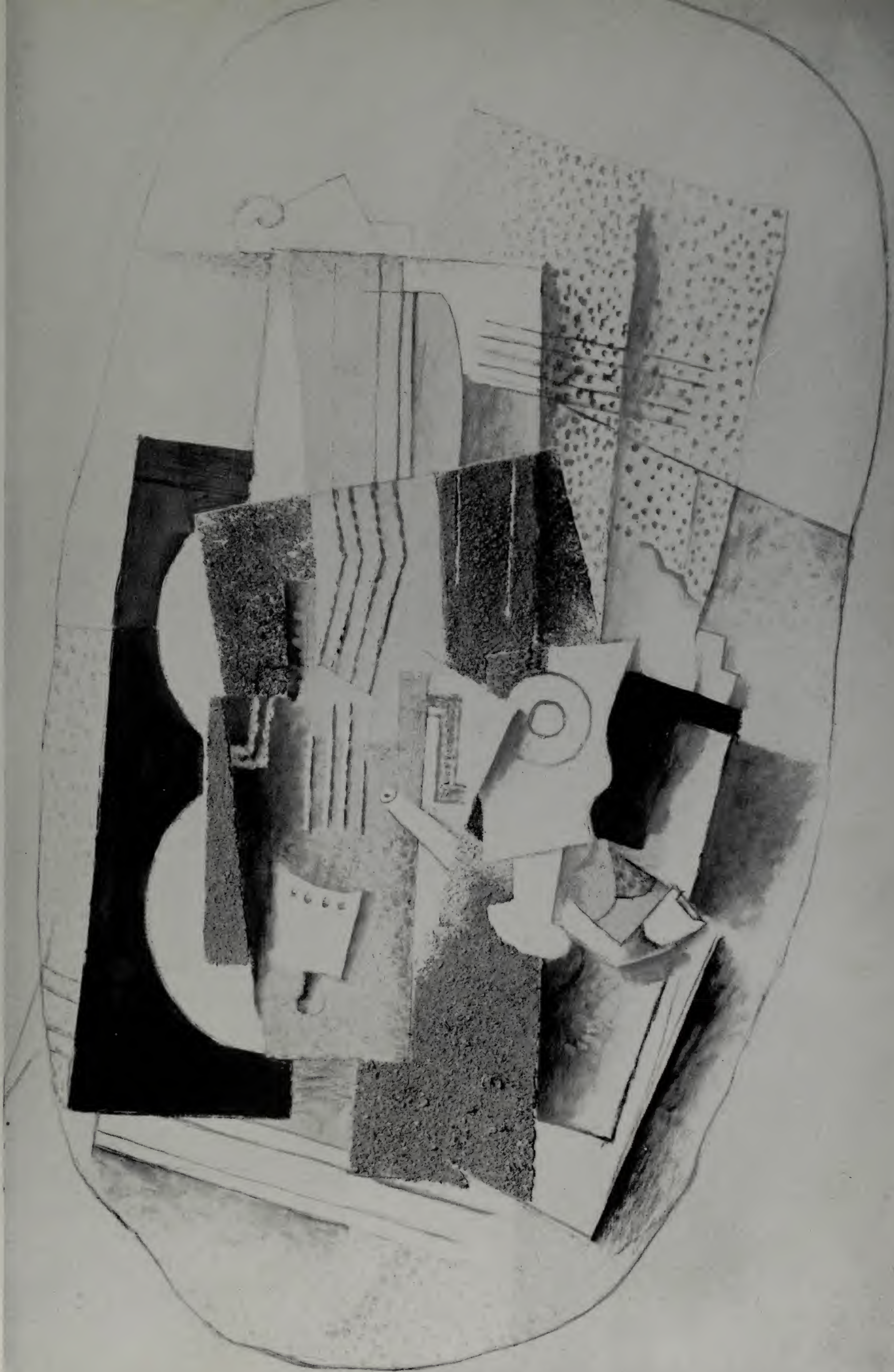




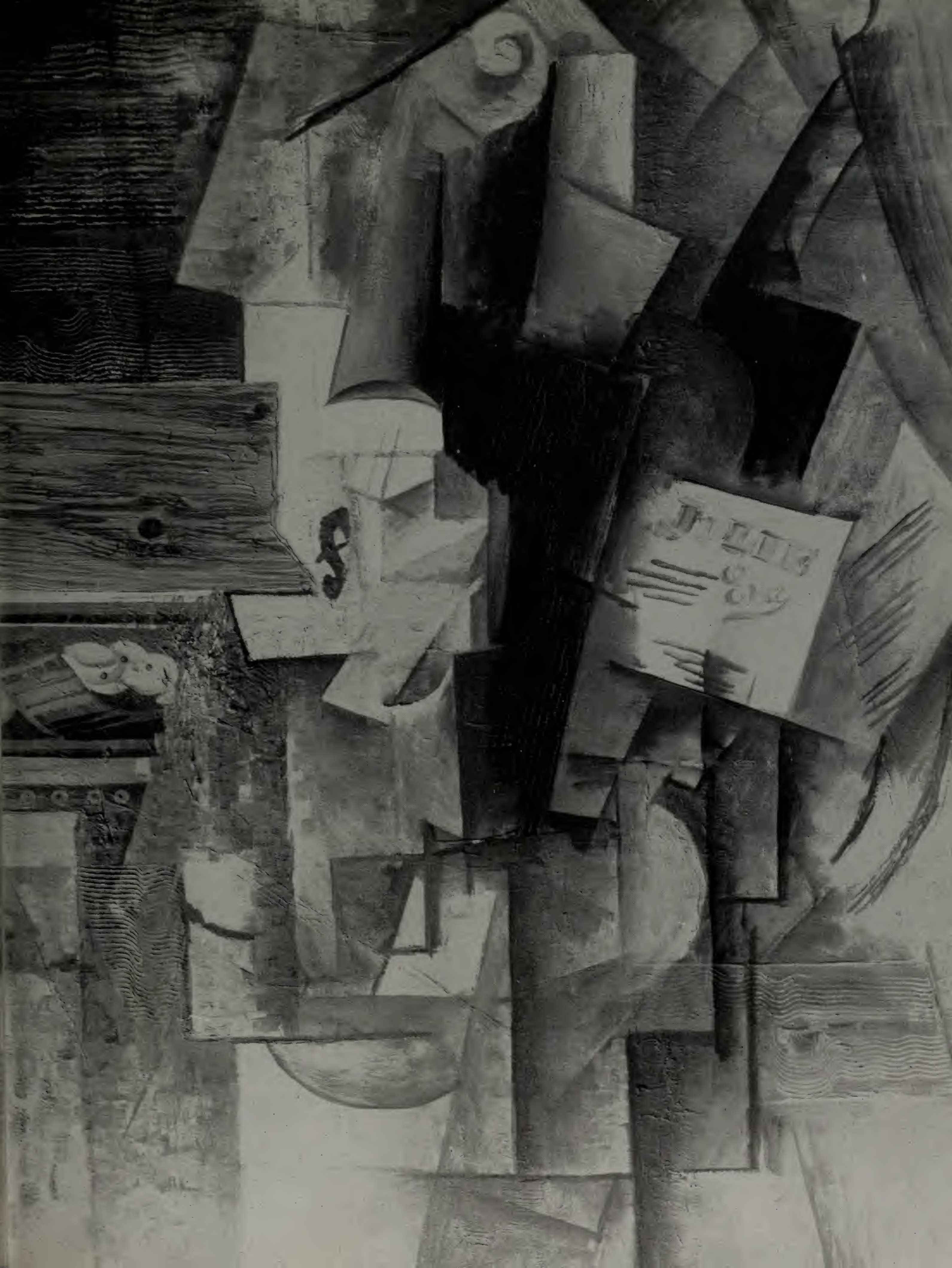
Fig. 167. Pablo Picasso, 1913
The violin

Fig. 166. Pablo Picasso, 1913
Collage

In the early cubist collages an astonishing skill was apparent in manipulating these planes. They were employed in a hide-and-seek combination, woven each behind and above the other. When one does not worry about what each element means in its naturalistic connotation, then one can enjoy the pictorial and graphic wealth of these interpenetrating planes, shadings and textures. One can enjoy the juxtaposed elements, the correspondence of lines and surfaces, the continuation of planes, passing far back under other planes and coming out from the back to the front to disappear again; one can enjoy the subtle modulations which are brought to a crescendo by the space-building power of lines crossing, curving around and running diagonally. All that is a celebration for the eye, a rhythmical and emotional exultation. To be sure, classical paintings offered such rhythms for the eyes, too. The correspondence of planes, shapes, lines, points were always the organizing elements of a visual expression. But cubism brought to all this a purity, arriving at a new visual microcosmos of primordial emotional values.

With the collage—which is somewhat analogous to the assembly technique of the machine technology and thus perhaps more readily acceptable—the cubists systematized their original aims. The collage is the peak of their efforts to create an efficient, spontaneous shorthand for a fuller vision. In the collages the cubists used bits of wallpaper, tobacco wrappers, newspaper clippings, pieces of book illustration as a visual synecdoche, the fragments standing for the whole.

Fernand Léger's paintings give the collage fragments another, new meaning. The object (*objet*) replaces the subject matter (*sujet*) of the past. In the new painting



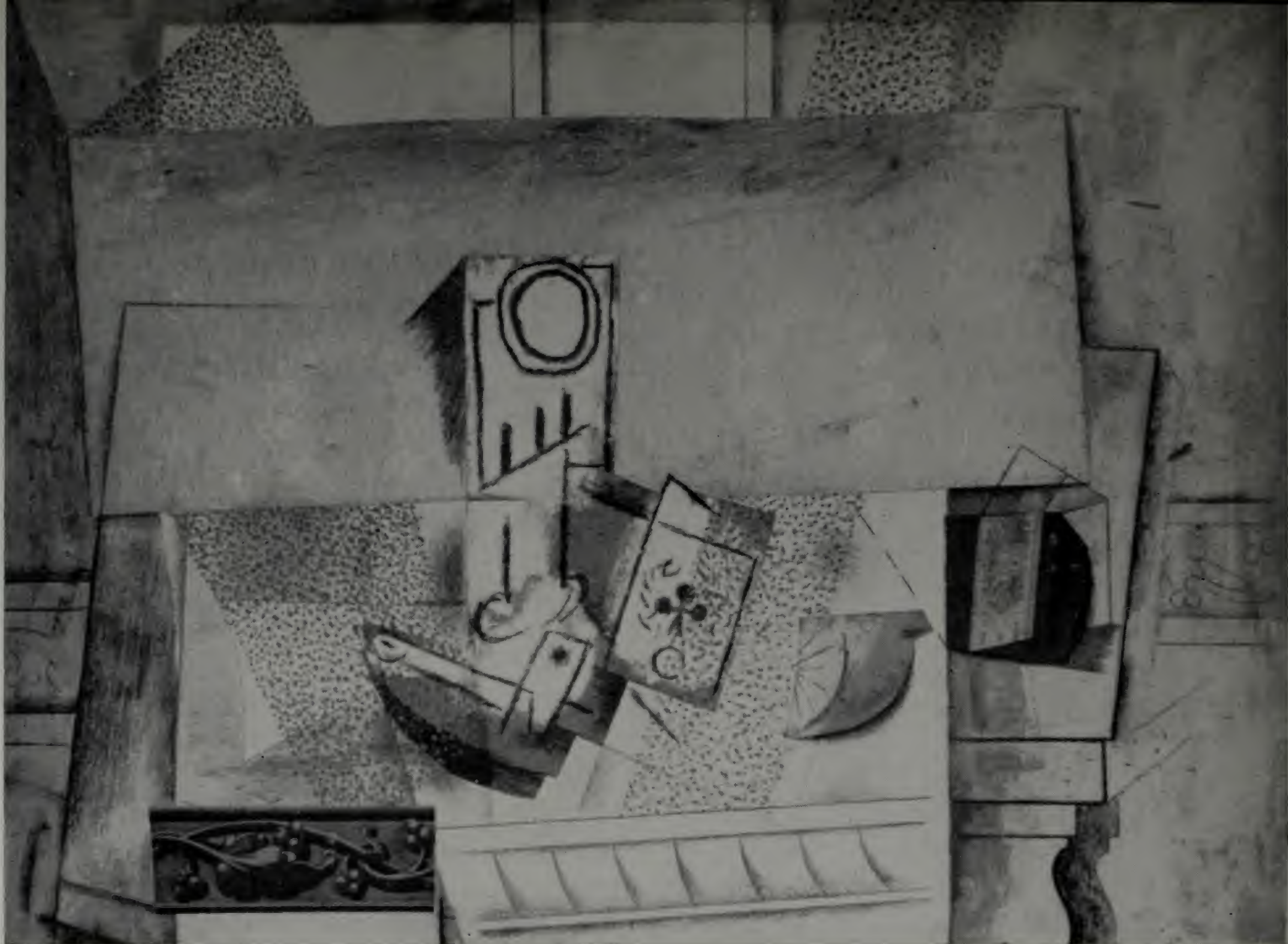


Fig. 168. Pablo Picasso, 1914
The clock (collage)

Fig. 169. George Braque, 1914
Collage

This collage is almost a completely abstract composition with only a slight trace of the object. It greatly influenced the work of the suprematists and constructivists.

Braque's collages represent a rich hide-and-seek relation of interwoven elements, relationships of light and dark; of horizontal, vertical and oblique.

The cubists introduced a new grammar into painting where the old rules of bending words, declination and conjugation, changed; where prepositions were used after the words and where the adjectives and nouns became verbs



Fig. 170. Kasimir Malevich, 1921
Composition

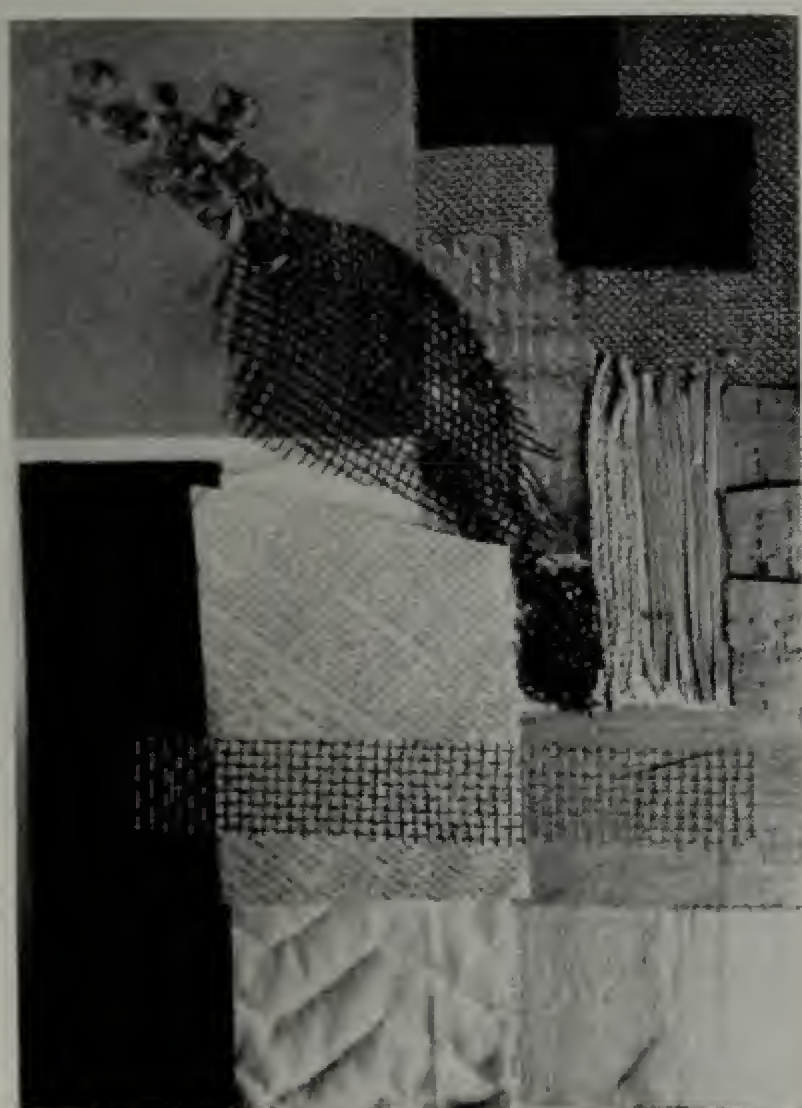


Fig. 171. Kurt Schwitters, 1920
Merz (collage)



Fig. 172. O Angelo Testa, 1942
Collage

In the Institute of Design, the collage became an exercise to coordinate drawing, painting and photography



Figs. 173 a, b. O Frances Senska, 1942
Collage and its exact rendering
This exercise is a great help for the coordination of the eye and hand.

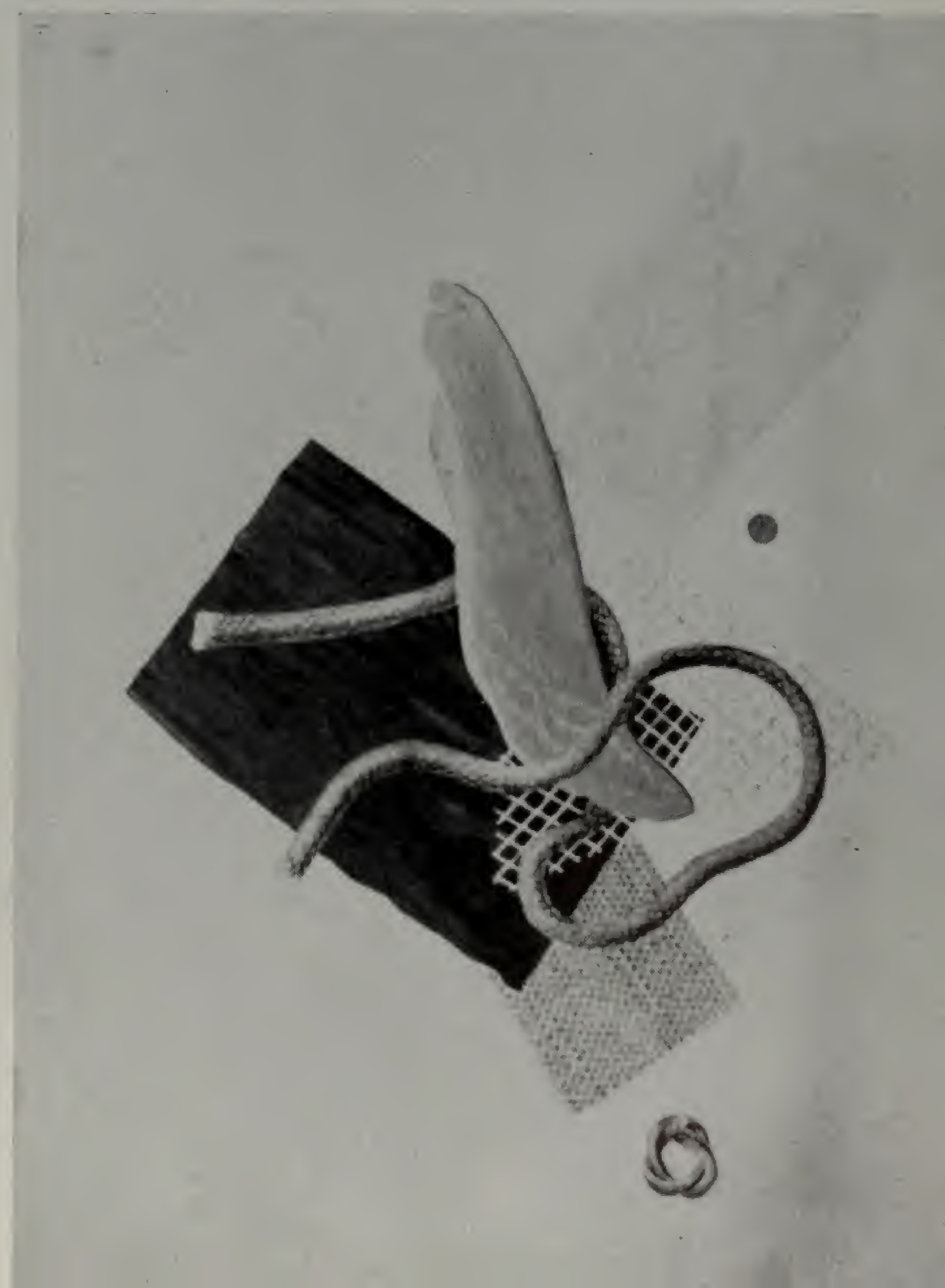




Fig. 174. Fernand Léger, 1919
Drawing

there is no need to resort to themes as in a battle picture or in a still life. The object alone suffices. In fact Léger uses not only objects but color itself as a selfsufficient element, as an "object"—preparing for the legality of the abstract, constructivist painting which was to be the next move.

Léger can be explained also through the connotations of the "object". His predominantly visual approach has a slight intellectual presupposition. In his later paintings the close-up of the detail designates the whole. He paints, for example, a nail and speaks with it for a barn; he uses a footprint in the sand to indicate a diver, a finger for the whole hand. However this is secondary to his approach. His most effective means of picture organization are forceful visual contrasts: three-dimensional with flat shapes; thick with thin lines; primary colors with black, white and gray.

Fig. 175. Fernand Léger, 1941
Farm Landscape





Fig. 177. Fernand Léger, 1941
Chinatown
Looking at the painting upside down, it
discloses a figure reminiscent of Chinese
characters



Fig. 176. A photograph of the dump on
the farm where Léger conceived his
"Farm Landscape"



Fig. 178. Paul Klee, 1930
Rhythmical
Klee is one of the great conjurers of color



Fig. 179. Theo van Doesburg, 1930
Arithmetic composition

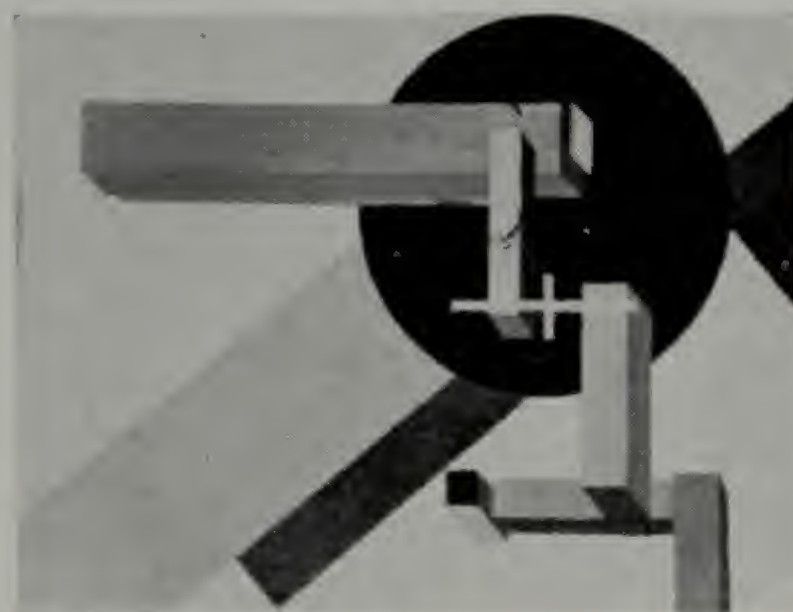


Fig. 180. El Lissitzki, 1919
Proun
Lissitzki stated that for him painting is a "transition to architecture"

Fig. 181. L. Moholy-Nagy, 1930
Construction on Aluminum
The synthetic materials have required a new painting technique which replaces the completely smooth "texture" of the previous constructivist pictures



To appreciate the painting of a cubist one should see it with the eyes, not with the mind. There is nothing reprehensible in being attracted by the eyes alone as a bee is attracted to a flower. Unfortunately, people do not dare to judge a painting until they are sure that "it makes sense", until it satisfies a superficial insistence upon "logic". This approach contradicts the direct visual process which transmutes a "picture" into the color, contrasts of light and dark and other fundamentals from which the real visual excitement emanates. Whether of old or new paintings, only one question should be asked: Does the painter give with the motion of his brush, with color, black and white contrasts, a unique visual experience no matter how much or how little of it can be put into words? This is the only valid testimony. One might then discover that two kinds of painters exist: one who tints (or colors) and the other who paints; the ones who are predominantly interested in the aspects of shapes (which, being painters, they "tint") like Raphael, Poussin, Ingres, Picasso, Arp, Lissitzky; and the others who concentrate on color and light like Greco, VanGogh, Renoir, Matisse, Kandinsky, Rembrandt, Klee, Mondrian. And there are of course the composite types like Cézanne, Seurat, Toulouse-Lautrec, Léger, Malevich, Miro, and some of the constructivists. The fact is that the pure type rarely exists and that the personality of painters best could be expressed by an equation: $P(\text{painter}) = C(\text{color}) + S(\text{shape})$, whereby C can be 80% and S 20% or vice versa. To be able to understand this means to understand the important components of painting. If the painter, for example, possesses the power of color, he can hardly make a "boring" picture. He may be somewhat confused, he may have to fight with his elements before he can arouse enthusiasm in the spectator, but his possession of this visual vitality is half the victory. The ability to produce this vigor of color, or for that matter, texture and other visual fundamentals, is mainly innate. But experience can help immensely to come closer to it especially if it is combined with the study of physiological and optical theories and if it is based upon a subconscious "philosophy".

•

In the analysis of cubism, many more particulars could be mentioned. There is the difference in Braque and Picasso collages. Braque used a complicated system of interwoven planes while Picasso employed simpler construction, the planes appearing more in isolation, though each was placed behind the other. These variances made Braque the father of suprematism as well as constructivism and Picasso of neoplasticism.

There is also the prophetic emphasis on texture, a visual "tactilism", through which the cubists emerged as winners in the fight against the ornament. The textures of the cubists were later transformed into flat, painted patterns—a development which still has to be studied by the practical men of the arts, by textile printers, commercial artists, advertising and packaging designers.

One could also show how postcubism, under the influence of surrealism, turned to the double, triple and quadruple images, to the pluralistic vista, the many in one. In contrast to the second period of cubism, where generally the rotated portrait stood for

Fig. 182. W. Kandinsky, 1909

Landscape

Kandinsky, as well as Matisse, can be derived—in their early stage—from Cézanne by a stepping up of his color scheme



Figs. 184 a, b. O Edward Golden, 1945

Textures

These rubbings were made on thin tracing paper and then used as photographic negatives

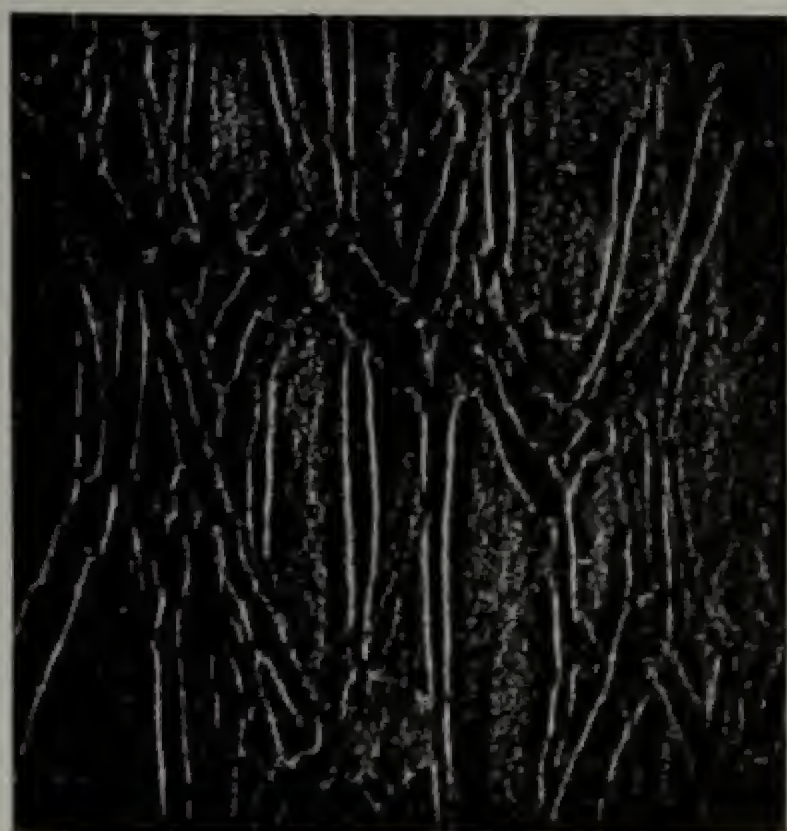


Fig. 183. Jean Arp, 1928

Neo-geometric relief



Fig. 185. Ralph Samuel, 1944
Earth pattern (aerial view)

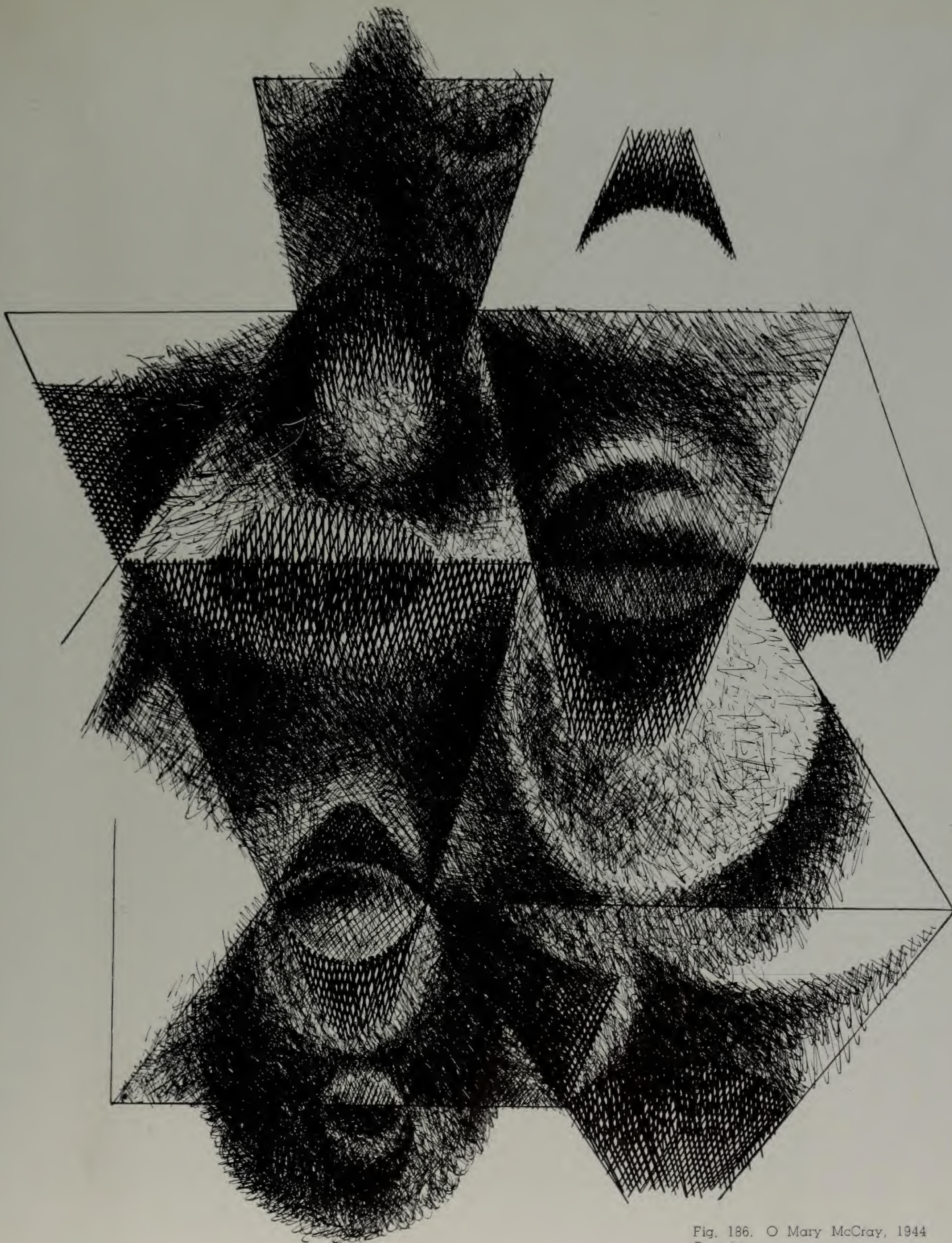


Fig. 186. O Mary McCray, 1944
Drawing

The conscious and delicate variation of
the line textures is a further development
of the tendencies found in cubism

Fig. 187. ○ L. Moholy-Nagy, 1935
Space modulator
Perforated zinc sheet painted on the front
and back

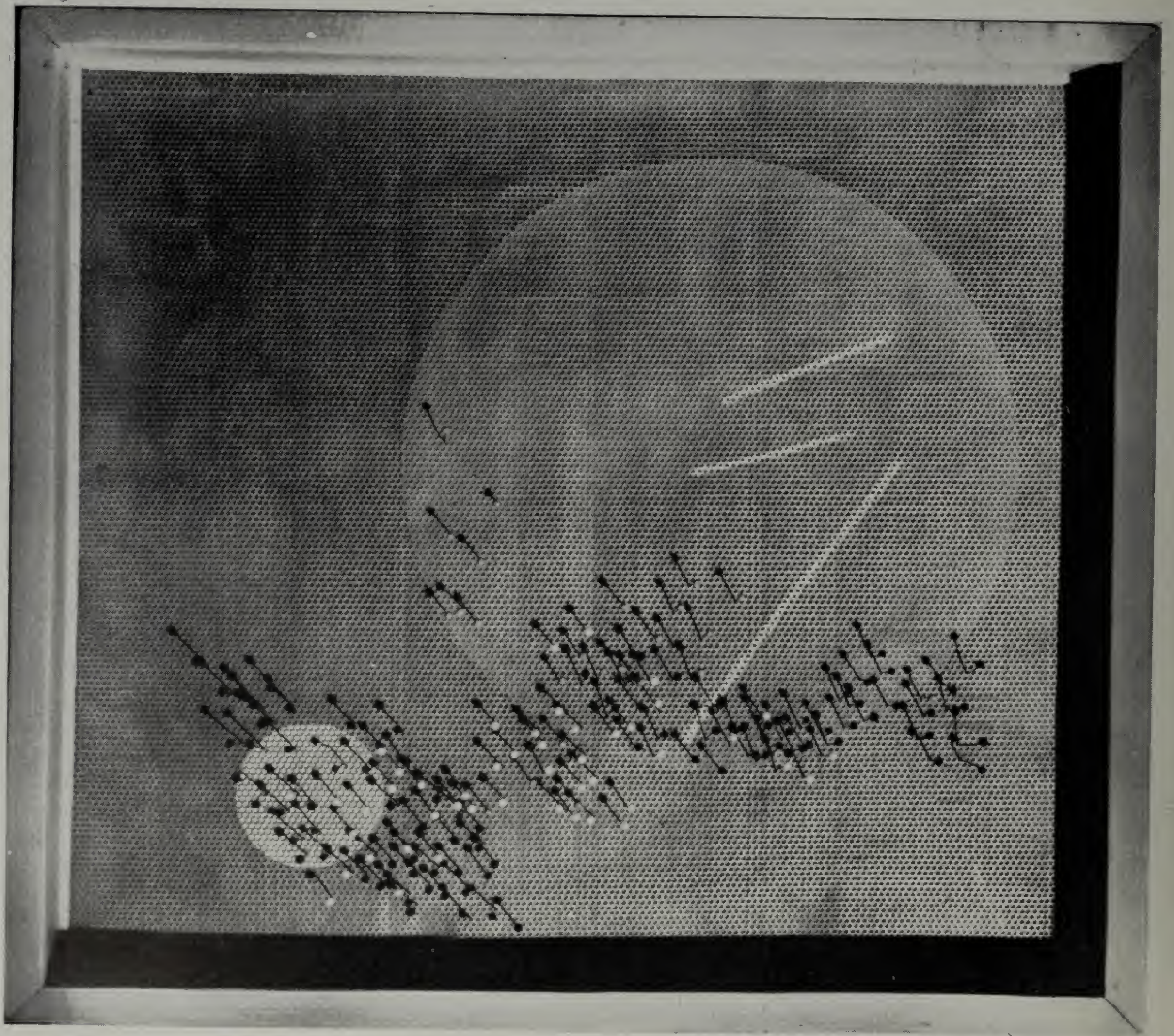


Fig. 188. ○ L. Moholy-Nagy, 1935
 Warping the plane by locomotion of
 points (space modulator in cork)
 Both of these pin pictures are basically de-
 rived from the collage. The difference is
 that the materials here do not symbolize
 objects but they are autonomous objects
 themselves, and so, carriers of pure tex-
 tures forming visual material relationships

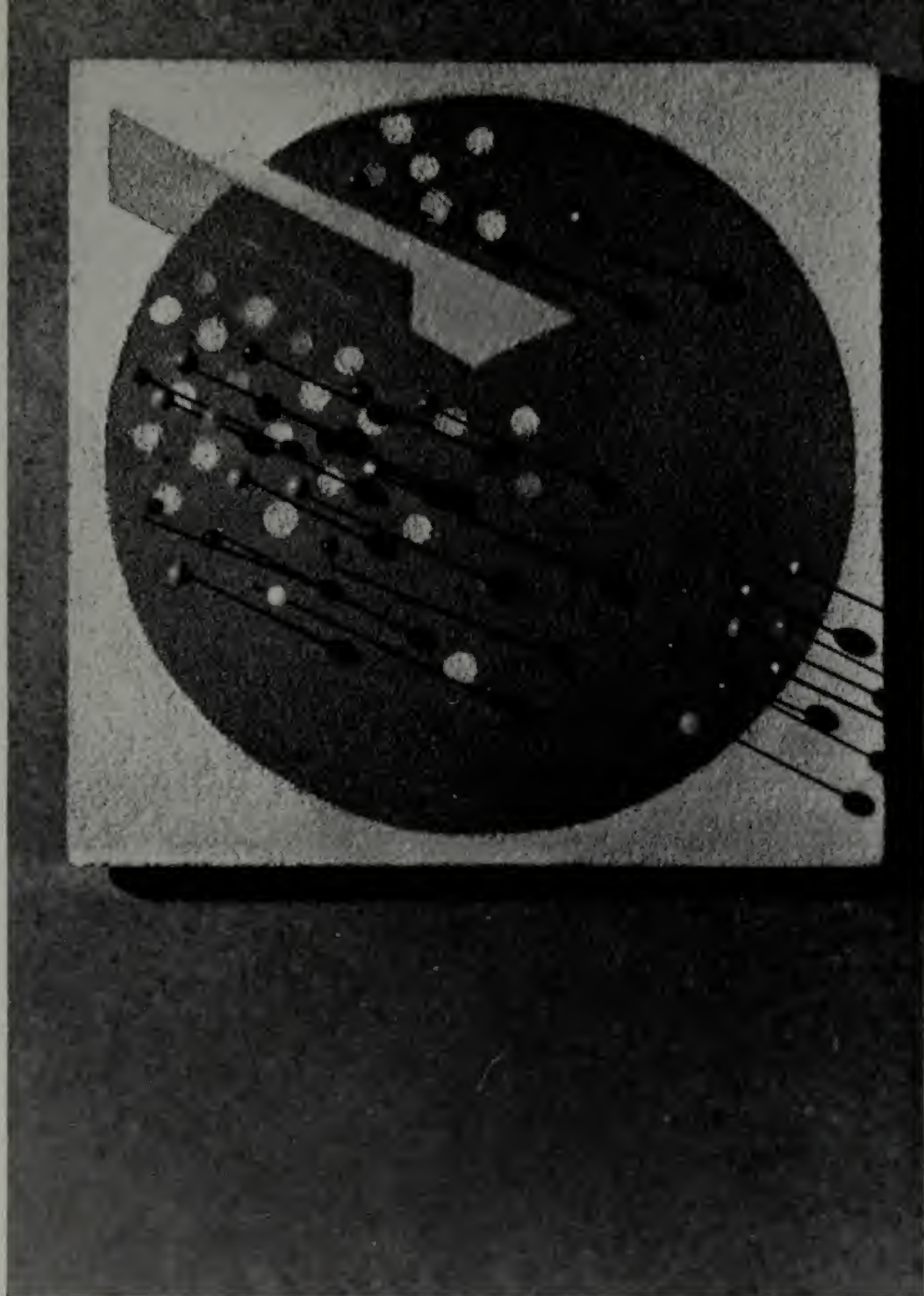


Fig. 189. ○ L. Moholy-Nagy, 1945
 Space modulator (on transparent plastic)
 "Light texture" as a further development of
 the collage

physical exactness, here different faces attempt to express the psychological mobility of a person; sometimes the female component of the male, sometimes the dark counterpart of the light half—a multitude of various psychological characteristics. (It seems to me that in 1914, Picasso in his little bronze sculpture, the "Absinthe Glass" showed such a double image; not only the vessel in motion but also the disintegrated features of the drinker.)

One could speak about more details, but the most important fact remains that, from its inception, cubism became a prime mover in the visual arts. All attempts at visual expression by the following generation have been directly or indirectly influenced by it. Young painters, however, despite a certain dependence on the cubist struggle for a "better understanding" of the external, physical universe, became more and more concerned with the pure use of visual fundamentals with which they were able to articulate emotional life, an inner vision in motion. Those young artists were the first in the history of art to express the emotional universe without manipulating a camouflage of externalities. •

• *The Guggenheim Museum of Nonobjective Art in N. Y. has the best collection of these painters' work in this country.*

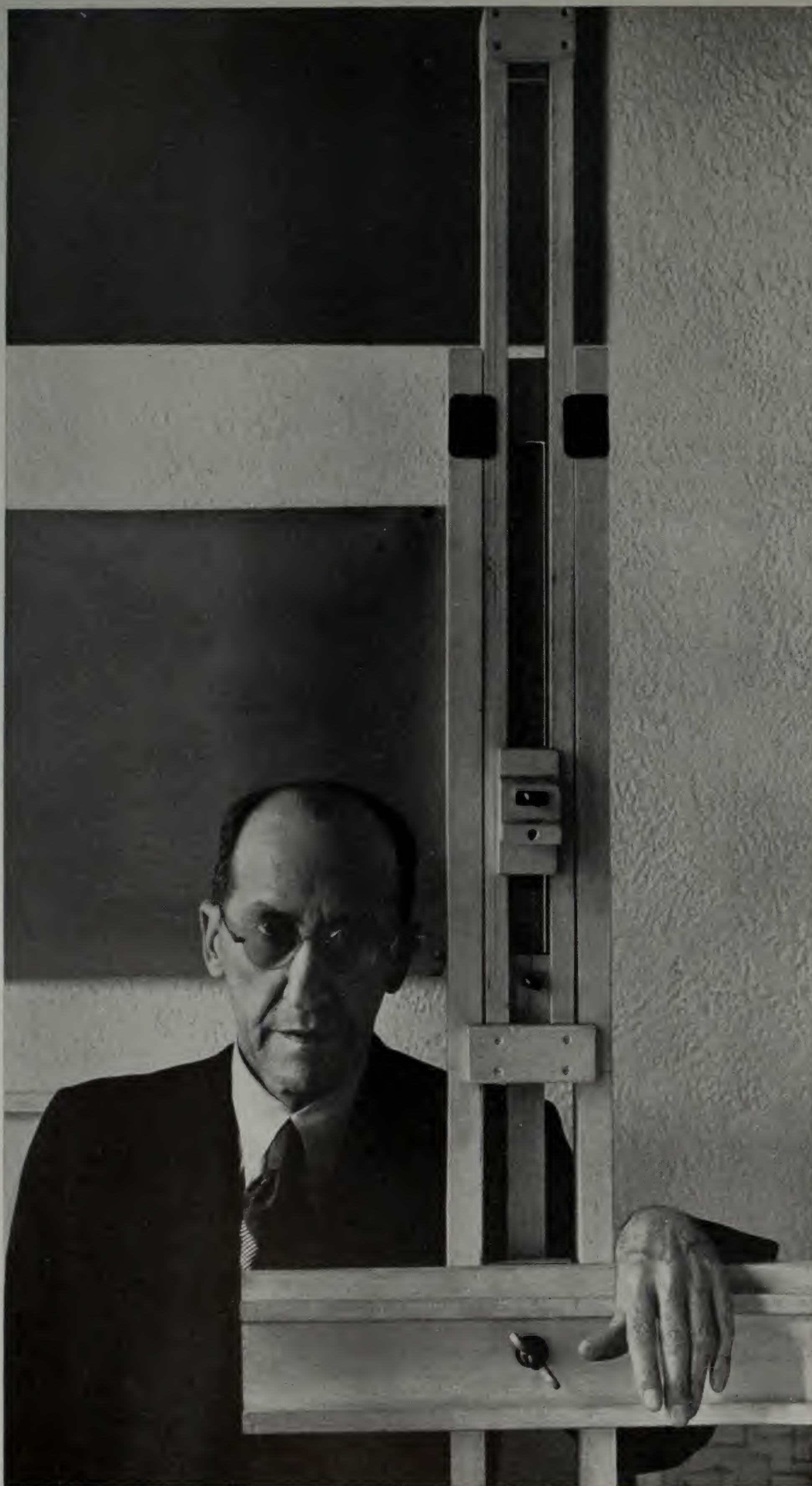


Fig. 190. Arnold Newman, 1942

The portrait of Piet Mondrian

An outstanding pioneer of abstract painting in the past generation is Mondrian. His writings and paintings are among the most valuable sources of the new art approach

Although there are rather clear and legible differences between the various art-isms, there is a tendency to lump everything in painting under the label "abstract" when it deviates from nature, and to label everything "non-objective art" when no traces of a naturalistic departure can be found. While for the art historian such crude definitions will not suffice, I am inclined to agree with this "folk" terminology as it slowly moves toward the greater simplification of the language (such as "automobile" becomes "car"), "abstract" and "non-objective" become simply the "Art" of the next generation.

Fig. 191. Piet Mondrian, 1915

Plus minus composition

This picture was painted from the fourth floor of a Scheveningen hotel in Holland, facing the sea. The small horizontal-vertical lines indicate the rolling waves and the backbone of the painting is the pier. In his later work (such as above, right) no such reminiscences of nature can be found

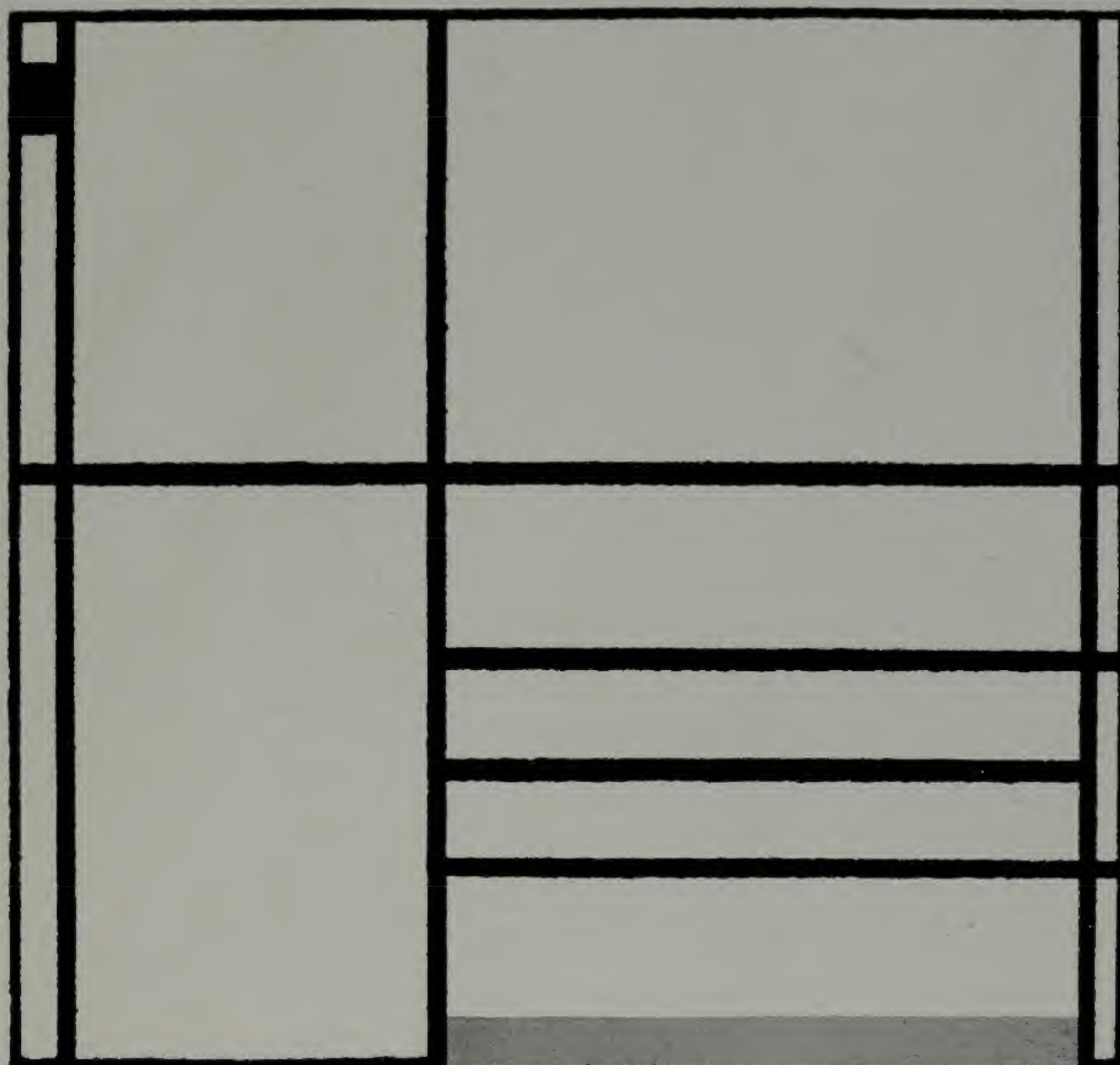
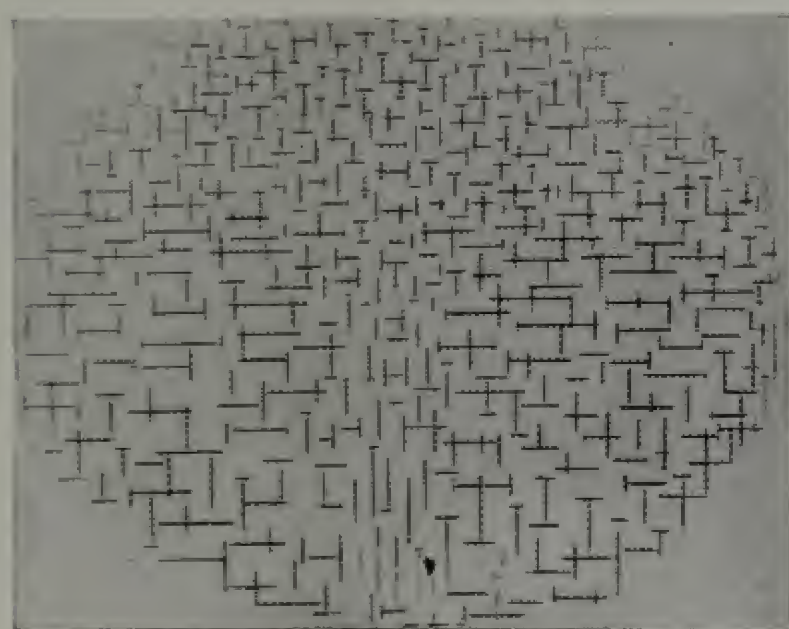
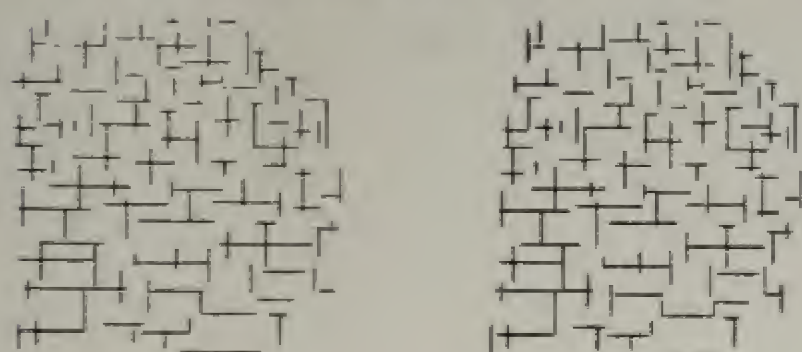


Fig. 192. Piet Mondrian, 1936
Neoplasticist composition



Figs. 191 a. b. O Leah Nolan, 1942

Stereoscopic translation of a detail of the above painting by Mondrian. Since lines can be understood as virtually suspended in space, this study was made to show the infinite richness of spatial positions of lines and their relationships



in defense of "abstract" art

Because he is not informed about the historic sequence of the artist's efforts, the layman is often unable to find the main direction, the "sense" in the art-isms of his contemporaries. There may be too many names: impressionism, pointillism, neoimpressionism, fauvism, expressionism, cubism, futurism, suprematism, neoplasticism, dadaism, surrealism, constructivism, nonobjectivism. But in analyzing the paintings of these various groups one soon finds a common denominator, the supremacy of color over "story"; the directness of perceptual, sensorial values against the illusionistic rendering of nature; the emphasis on visual fundamentals to express a particular concept. Contemporary art generally tends more toward the direct and sensuous than the literary conceptual values. It emphasizes more the general, the universal than the special. It is based more upon biological than symbolic function (without excluding the possibility of its later transformation into symbol meanings).

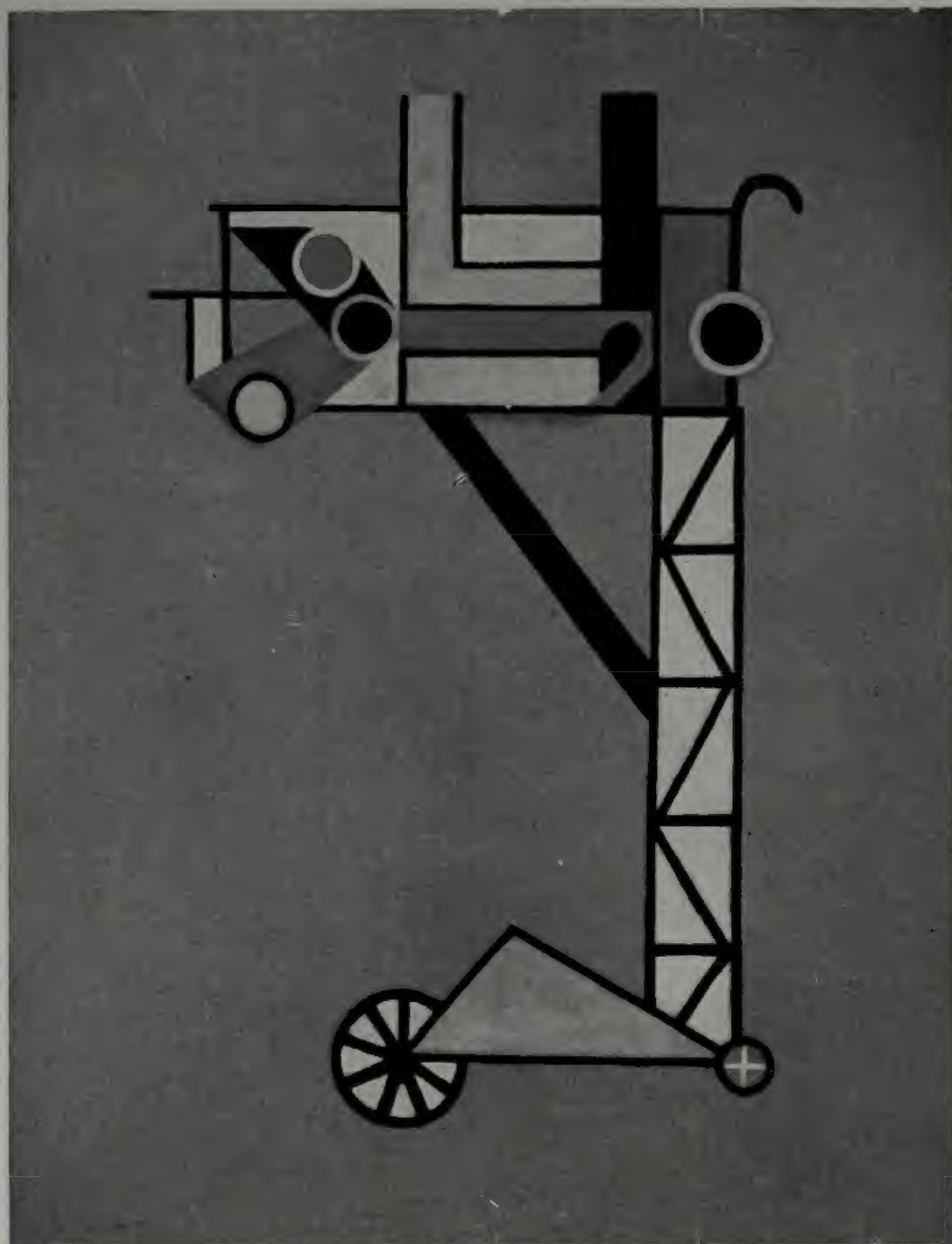


Fig. 193. ○ L. Moholy-Nagy, 1920

Construction

At the beginning of neoplasticism and constructivism, there were traces of a naturalistic influence as in this painting, for which the point of departure was a 25 to 30 feet high cable-repair-car of the tram company in Berlin. This seems to justify the general belief that the painter *must* depart from nature. The truth is, however, that in the later phase of the development my and my friends' paintings emanated from an inner vision without any recourse to "motives" from nature or technology

It is a favorite saying that an artist has to start from nature, that no painting or sculpture exists which hadn't been stimulated by direct visual experience. Such statements are often quoted to disparage the efforts of the younger generation. "There is no abstract art. You must always start with something. Afterwards you can remove all traces of reality." (Picasso)

It is time to make a counter-suggestion and show that such statements are erroneous because it is only the relationship between visual elements and not the subject matter which produces visual structure with an intrinsic meaning.

Fig. 194. Robert Motherwell, 1943
Untitled (Mexico)







Fig. 195. Herbert Bayer, 1944
Lamiferous landscape



Fig. 196. Wassily Kandinsky, 1925
Little Dream in Red

Kandinsky is the great initiator of abstract painting, whose theoretical work represents the beginning of a new art history which, as he states, "in its consequent development will grow beyond the frontier of painting and, in fact, art in general"



Fig. 197. George L. K. Morris, 1939-1943
Mural composition

Fig. 198. ○ Robert J. Wolff, 1945
Painting VI (New York group)





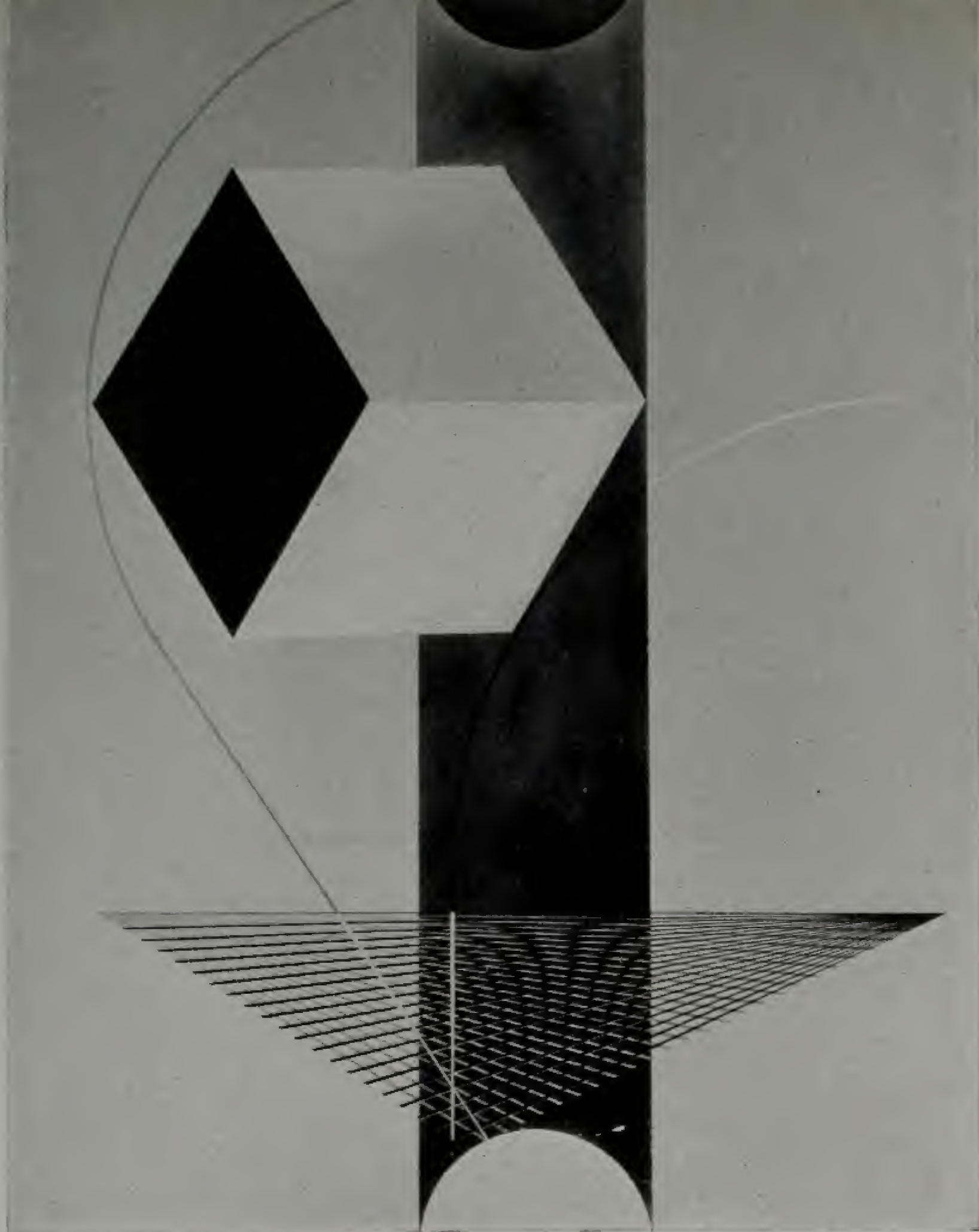


Fig. 199. El Lissitzki, 1924-1925
"Construction 99"

One often hears that the constructivist paintings are cold and dispassionate—emotionless.

This is, however, only the reaction of the uninitiated. The neoplasticist, constructivist and non-objective paintings do have emotional content and meaning presented, however, with generally valid and objective psychophysical fundamentals rather than with the representational language of the individualist, the capriciously emotional artist of the past.

There are two tendencies in contemporary painting: the one which wishes to overcome the imitation of "objects", (anything at all to create the illusion of three-dimensional objects on the picture plane); and the second which tries to build up a new "pictorial space" with the receding and advancing, centrifugal and centripetal, etc. forces of color.

Fig. 200. ○ Werner Drewes, 1938
Painting

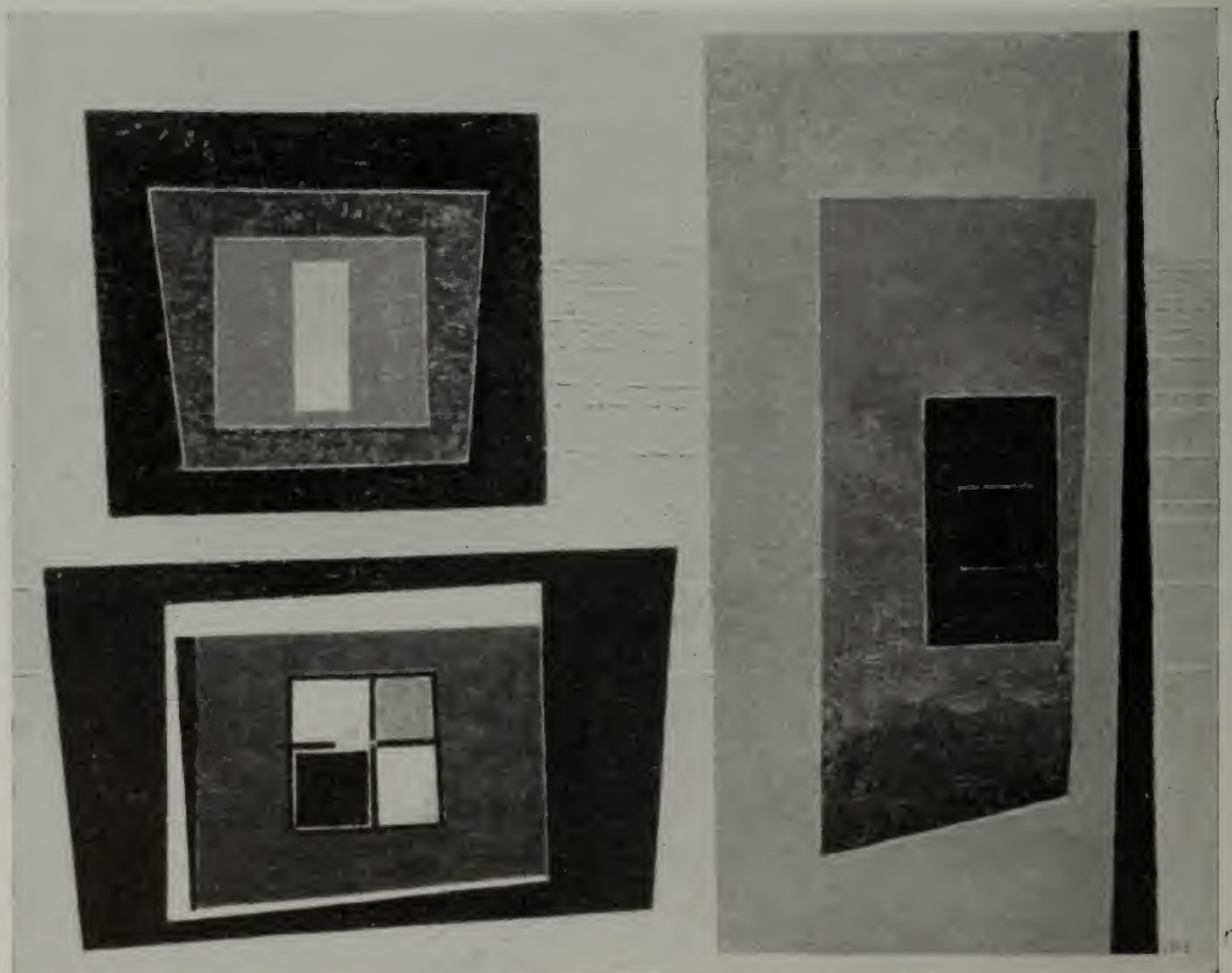




Fig. 201. Ben Nicholson, 1937

Relief

Positive-negative interrelatedness.

If this picture is turned upside down the negative incision (intaglio) will appear as a (raised) bas-relief

Like the semanticist, who strives for logical cleanliness, a clearing away of loosely trailing connotative associations in the verbal sphere, the abstract artist seeks to disengage the visual fundamentals from the welter of traditional symbolism and inherited illusionistic expectations. We should exult in this puritanic task and not merely be frightened or stumble into a possible richness which the old connotations may yet yield. We must leave the arts with a clean surface that only permanent and vital meaning, native to the age yet to come, may adhere.

The intrinsic meaning of an abstract painting, as a peculiar form of visual articulation, lies mainly in the integration of the visual elements, in its *freedom from the imitation* of nature and the philosophy connected with it. In the past, nature—observance and contemplation of it—has been a mighty stimulus because of its balanced, organic performance. But the naive idea of identity taken over from late Greek culture led only to a servile imitation.* The first powerful lever of liberation was concomitantly developed with the empirical technic of scientific research, that is, the “laboratory aspect” of science where the conditions of observation can be produced and varied at will. Impressionism and cubism brought a re-evaluation of nature in terms of visual research still intermingled with naturalistic elements. The art of the postcubist period derived its first abstraction from nature, but later it freed itself from that departure and articulated the basic means of visual impact—shape, size, position, direction, point, line, plane, color, rhythm—and built with them a completely new structure of vision. This was their attempt to grasp emotionally the problems of space-time. One function of abstract art was and is the experimental demonstration of the forceful possibility of such an approach and to extend it also to the problems of the inner vision and the inner vision in motion.

This fundamental concept and concern of the abstract painter does not seem to be involved in the details of “social reality.” Consequently, abstract art is often interpreted by the social revolutionaries as the art of the escapists. But the artist’s duty is not to be always in opposition. He may concentrate his forces on the central problem of visually constituting a better world, yet to be born, and may or may not treat the shortcomings of society as transitory facts on the periphery of his efforts. In a deeper sense, the interpretation of space-time with light and color is a truly revolutionary act.

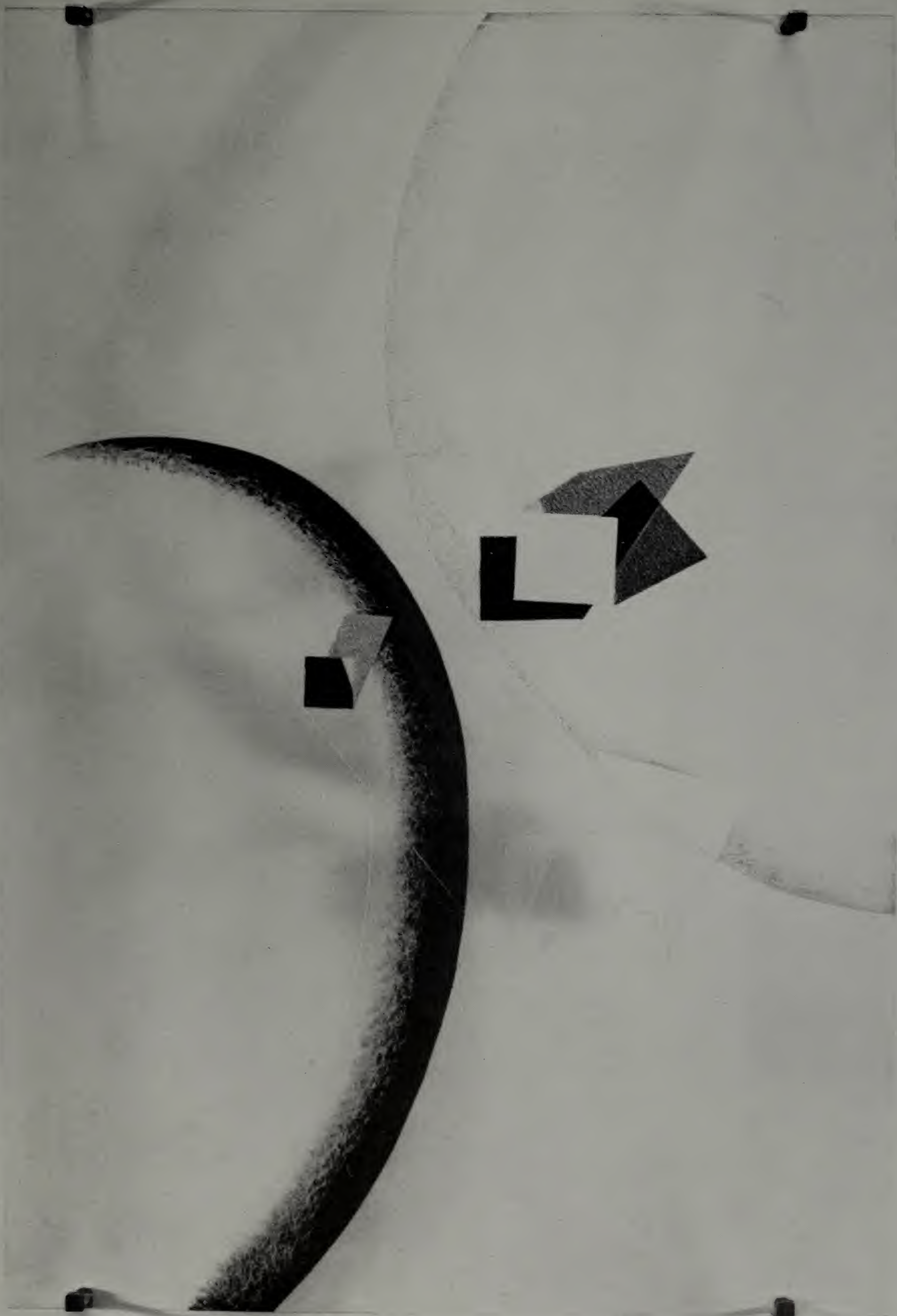
Color and light are the prime movers of abstract, nonobjective painting; the basis of a research which serves with its pure structural values, not only as a measuring rod for a new “esthetics”, but in their functional values for a desirable new social order. On another level, abstract painting can be understood as an arrested, frozen phase of a kinetic light display leading back to the original emotional, sensuous meaning of color of which William Turner (1775-1851), the great English painter, was an admirable predecessor.

* “Art is an imitation of reality. It holds the mirror up to nature.” (Aristotle in “Poetics”.) But it simply goes beyond human abilities to create the exact replica of an organic structure.



Fig. 202. Willi Baumeister, 1938
Composition

Fig. 203. L. Moholy-Nagy, 1940
Space modulator with fluctuating black and white arcs
This painting introduces a psychologically determined motion if one tries to define whether the black or the white arc is in front of the other. There is the feeling of a definite movement of the arcs forward and backward



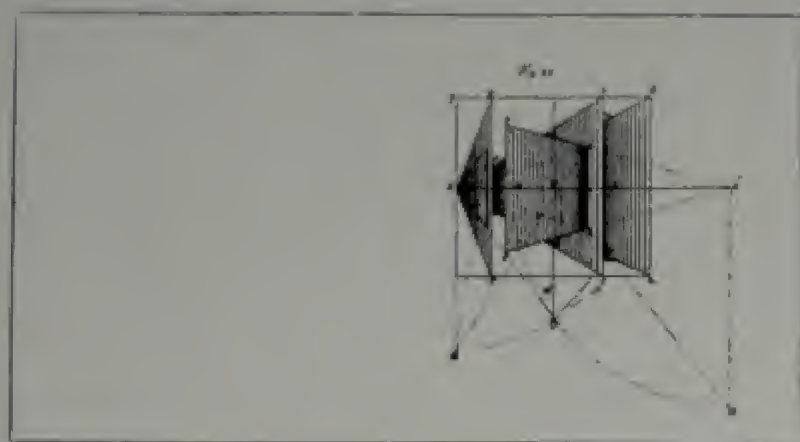


Fig. 204. Amadeus Merian, 1828
A construction in the study of Hummel's free perspective

In the renaissance, the function of color was auxiliary to the perfect illusion of objects in space. Monocular perspective was devised to produce that illusion with the help of color. It is important to observe that these paintings had to be viewed from one certain point whence the scene would appear undistorted. Today, we find unbearable this fixed relationship of the spectator to the painting in which his observation is permanently bound. (In fact, in the same way, we find all other fixed and rigid point of reference, static relationships, unbearable.) Renaissance painting wiped out the prerenaisance directness of visual experience and became not only static but also strongly illustrative. Prerenaisance painting did not try to imitate reality. It admitted that it had been painted to express moods, devotion, wonder, and ecstasy with the sensuous and emotional power of color. It emphasized less the "story" and more the vital performance of color to which the spectator could react directly without reasoning and conscious analysis. The decay started with the vanishing point perspective which seemed to be a dazzling performance, since the painter could render scenes as the eyes perceived them. Suddenly every effort was concentrated on the perfection of imitation with the result that three hundred years of practice by the "perspectivists" taught everybody to evaluate painting by its illusionistic potency. Their method of rendering became the automatic possession of generations who did not even have to learn the original rules of geometric construction; who knew by heart "how to do it."

When photography appeared, the excitement of this manually produced space and object illusion diminished; it could not stand the competition of the mechanically

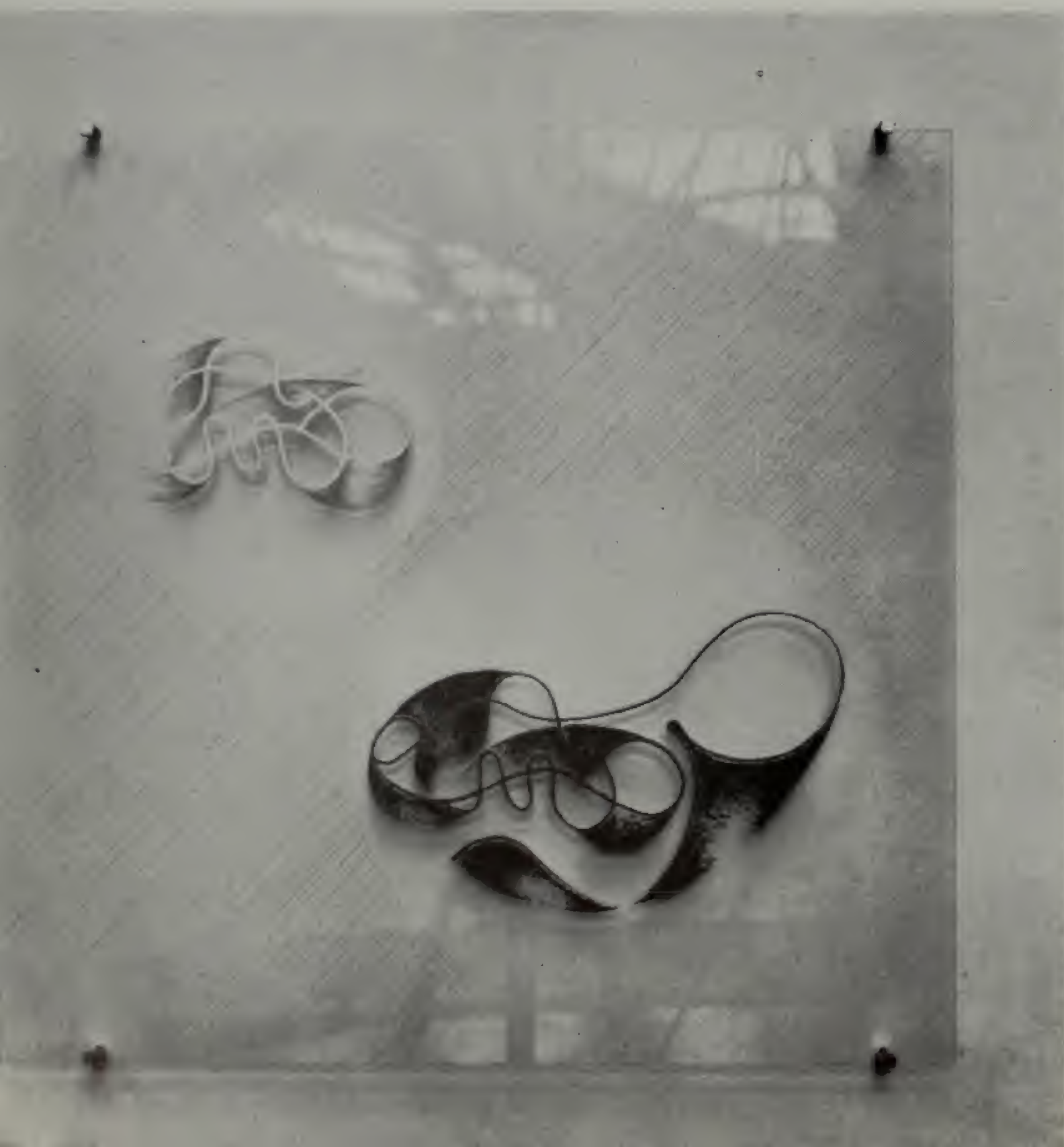


Fig. 205. ○ L. Moholy-Nagy, 1940
Vision in motion (space modulator)

perfect execution of most complicated, though also monocular, photographic perspectives. Contemporary painters, confronted with the static, restricted vision of a fixed perspective, countermarched to color and produced on the flat surface a new *kinetic* concept of spatial articulation, vision in motion.

vision in motion

vision in motion

is seeing while moving.

vision in motion

is seeing moving objects either in reality or in forms of visual representation as in cubism and futurism. In the latter case the spectator, stimulated by the specific means of rendering, recreates mentally and emotionally the original motion.

vision in motion

is simultaneous grasp. Simultaneous grasp is creative performance—seeing, feeling and thinking in relationship and not as a series of isolated phenomena. It instantaneously integrates and transmutes single elements into a coherent whole. This is valid for physical vision as well as for the abstract.

vision in motion

is a synonym for simultaneity and space-time; a means to comprehend the new dimension.

vision in motion

also signifies planning, the projective dynamics of our visionary faculties.

stages in space interpretation

No new approach in rendering and interpreting space can ever be fully evaluated without the knowledge of traditional pictorial representations. The new can best be measured through its relationship to the old. Since prehistoric time, painting was connected with spatial interpretation and has employed color and imagery in numerous forms of spatial articulation, a few of which can easily be listed:

rhythm—in rock paintings

layers above each other—by the primitives

layers beside each other—in old bible (codex) illustrations

size differences, great and small, tall and short—in mediaeval paintings of madonnas, saints and angels

parallel perspective—in prerenaissance paintings

vanishing point perspective—in the art of the renaissance

spiralling and other types of motion—in the baroque

air-perspective—in Poussin and his followers

layers, planes, behind each other—in David's compositions

strong foreground framing—in paintings of Degas

sharp, unsharp—in paintings of Vermeer and Renoir

mirrorings and reflections—in paintings of Manet
distortion such as the bird, frog, worm and fish-eye views—in the foreshortenings of
 Mantegna and the baroque murals and—later—in expressionism
receding and advancing colors—consciously begun with Cézanne
penetration of planes
interchangeable positive and negative patterns
superimpositions
crossing lines
many-faces-in-one (pluralism)

} in cubism
 and suprematism

explosion
stroboscopic view

} in futurism

transparency and moving light—in x-ray photos and constructivism.

This enumeration has no value order. The evaluation depends upon the unadulterated use of the visual means to express sociobiological concepts. For example, starting with impressionism and Cézanne, cubism brought a new sensibility to visual fundamentals embodying vision in more perceptual than intellectual terms through lines, planes, color, texture and their spatial qualities; a new meaning of crossings, shadings, juxtapositions of positive and negative pattern, divergence of directions. Cubism discarded the obsolete anthropomorphic illustrative space of the renaissance. It built up a new construction, of visual rather than literary connotation. Though cubism in its first phase did not work with strong primary colors, the introduction of numerous whites and grays and browns created a new color consciousness, new degrees of spatial refinement in the receding and advancing values. Kandinsky and other abstract painters such as Malevich, Mondrian and the constructivists developed this further by plunging into the clear primary colors. This advance was bound to be followed by the direct use of colored light itself, pleading for a higher order of space articulation escaping all literary concealment.

on color

Among the historical means of pictorial expression, color evoked the strongest response. It had been investigated far longer and more effectively than other means of expression, such as shapes or tactile values. But in spite of growing scientific and practical research our conscious knowledge of color is still deficient. To be sure, there is a concept of color and a knowledge of details, but there are still a great many missing links.

One of the best research workers in color is the painter who has an instinctive feel for color and who has learned a good deal more about it through incessant experimentation. With color he builds space, records emotion, organizes life. He can whisper as well as shout with it. But can he always be sure about his effects and his sphere of influence? Can he plan with certainty? The truth is that the normal, physiological response to color often becomes confused by symbolic reference to past civilizations. For example, counterrevolutionaries memorialized the bloody sign of the

guillotine during "the reign of terror" in France in the form of a red scarf, but today red is the color of revolution. •

Color is embedded in tradition and symbolism. From the time of the first flags and emblems, creating the romance of heraldry, the customs of religions, peoples and nations have been given meaning by hues of the spectrum. Even the color of ice cream to a child or a girl's dress to a sweetheart can produce lifelong symbolic fixations.

Contemporary painting tries to free us from such fixations by emphasizing again the direct sensuous perceptual impact of color upon the spectator.

Color preferences seem to go along with certain personality traits. Most people are born with a natural liking for the colors at the two ends of the spectrum—red and blue. Children and primitives are particularly attracted to vivid, vital primary colors, especially red and yellow.

Colors have different properties. They can be pure, intense, dark, warm, cool; they can appear large or small, near or far, light or heavy, concentric or eccentric. Deep colors tend to appear heavier than pale colors. The lightest of all colors is white and the heaviest is black. The brighter the color, the larger it appears. The "largest" color is white, followed by yellow, red, green, blue, and black. Colors are also cold or warm. The greens, blues, and blacks are considered cold; the yellows, reds, and whites warm. Warm colors seem to advance, the cold ones recede. The lens of the eye does not focus equally upon all hues. Red makes the eye "far-sighted", by causing the lens to grow thicker. This action will give red a nearer position than blue which causes the eye to grow "near-sighted" as it flattens the lens. A relative complication sets in when one knows that every color can be made warm *or* cold by being mixed with the neighboring color at either side.

An experiment made at the University of Wisconsin gives an explanation of how color is able to change size or show receding and advancing values, producing stereometric and space values. Black, white, yellow, green and blue cubes of the same size were put alongside each other. The white cube appeared to be the largest, black the smallest. Yellow was larger than green and blue was smaller than green. The same phenomenon can be formulated in other words: the white cubes, seemingly the largest, appeared to be nearest the spectator; the black, the smallest, appeared to be farthest away—which is again another expression for the receding and advancing value of color found in the cold and warm hues.

Painters not only sensed such phenomena in isolation but really laid the foundation for a whole new system in the treatment of space as Cézanne did in his pictures where a new type of space articulation appeared. He not only tended to use color in its direct sensory impact but was the first who tried to overcome the illusionistic space (vanish-

• *S. Eisenstein in his book, "Film Sense," gives a thorough account of these symbol values.*

ing point perspective) with the pure spatial properties of color. Cézanne's pictures generally appear as two-dimensional because of the use of flat planes, but they really can be seen best in their three-dimensional quality created by the receding and advancing values of colors, indicating near and far.

Painters may twist the original characteristics of colors. Indeed, the constructivists' work often offers such surprises, for example, that black or blue can be made to stand in front of white.

The upper part of a black plane can be made to appear bluish if a yellow plane is juxtaposed; the same black below can simultaneously appear reddish beside a green plane.

The psychological after-images and the subjective changes in the neighboring colors have until now been little observed, though they are valuable elements in the painter's craftsmanship. For instance, Juan Gris used in one of his cubist pictures (in the Philadelphia Museum) light brown and black which were "psychologically"—that is, in the spectator's eye—mixed to violet in the middle of the canvas. Then with the pigment embodying this hypothetical violet he covered a large surface on the painting. This painted violet appears out of key only until one is able to perceive the virtual violet, justifying the painted one.

The basic approach of the renaissance painters—and even more, of their followers—was built upon the observation that surfaces of objects reflected or absorbed certain parts of the spectrum. As some pigments possessed similar qualities they were used for the visualization of the original effects observed on surfaces of bodies. A three-dimensional object, if normally lit, disclosed a plastic shape through its lighter and darker shadings. In a civilization which concentrates its efforts on recording rather than expressing the painter had only to observe those shadings and simulate them. He mixed different pigments and put them on his canvas in the observed order or used other techniques for the same effect.

Over the centuries painters accumulated secret methods to achieve the radiance of color observed in nature, by subtle manipulations, through fine shading, underpainting, transparent varnishing, juxtaposition of complementaries, psychological after-images, colored spots, shadows and other finesses of a color dictionary. Through such efforts they often achieved an intensity almost equal to the natural phenomenon. The most successful applications resulted when the painter did not mix the pigments on the palette, but "in" the eyes of the spectator. It was known already to Aristotle• that colors in juxtaposition will mix on the retina when seen from a distance. This principle was employed in Byzantine painting as well as in the Florentine and Venetian pictures of the 14th and 15th centuries. Fra Angelico and Botticelli used for the features of their models a thin coat of green coloring as a first layer and then covered the green surface with innumerable fine red lines, the result being a delicate whitish-yellowish flesh color, such as the faces of angels and saints are supposed to have.

• *"De Sensu et Sensilibus"*



Fig. 206. Juan Gris, 1915

Still life

The upper left corner of the picture is painted red-violet. As a psychological after-image, exactly the same color appears in the middle of the picture although the surface there is painted black and brown

An old rule required that a picture had to be looked at from a distance eight times its diagonal measurement. The purpose was to secure the right position for a "subjective" mixing of the first layer and the superimposed strokes in the eyes of the onlooker. This mixing in the eye produced marvelous radiant effects. Nevertheless the real fascination of color, the inner glow of a painting—its foremost quality—could never be put down in rules. This depended on the stroke of genius and had to be found and interpreted anew by every painter.

When scientific advances, especially the vanishing point perspective, made the renaissance painters believe that they could successfully cope with the problem of a perfect spatial illusion, radiance of color was only applied for this end. Michelangelo's unfinished canvas in the London National Gallery is a good example for this point. Ironically, the *illusion* of flesh coloring has been attained in this picture by *abstract* means. He used a green undercoating. The shadows of the green clothes, however, he painted first in red, then varnished with light transparent green, the whole being apprehended by the eyes as green fabric with dark folds.

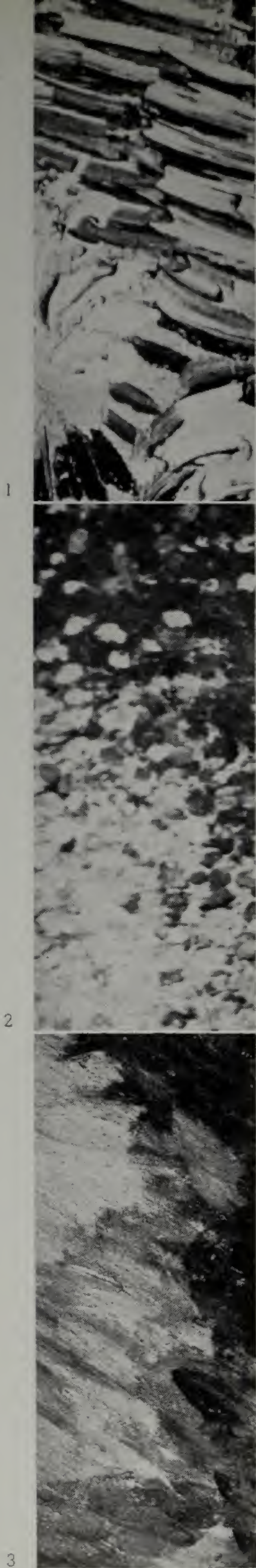
Rubens used the optical energy of the "turbid" medium in order to obtain deceptive flesh colorings with transparent blue shadows. Until his "secret" was discovered• nobody could ever copy his paintings. In comparison with his radiant transparent colors, every imitation by pigment mixtures seemed dull and heavy. Rubens sketched his paintings with brown brush strokes on a white background and painted over the whole with a creamy translucent white. The result was a transparent orange rose, the marvel of pink skin with bluish transparent shadows. By purely optical effects with the use of a viscid white he achieved this flesh tone, impossible to repeat by customary mixture of pigments alone. ••

The knowledge of such effects, though mainly applied for the purpose of naturalistic illusion, enlarged the painter's professional skill and helped to realize—as in the post-baroque period—a "superhuman" beauty born of nostalgia for a better past. Tiepolo painted shadows on a face not with gray or brown but with vermilion red. ••• The result was greater lightness and intensity because of the elimination of the muddily-mixed dirty tones previously used for shadows. The successors of Tiepolo lighted up

• by Professor Ruhemann, Courtauld Institute, London

•• Goethe gave a physiological explanation for these effects in his antiNewtonian color theory. He established the fact that through a "turbid" medium dark appeared as blue; and light, seen through a turbid medium produced yellow-orange to yellow-red. ("Turbid" here means layers of translucencies.) He explained that the sky is blue because we look through the "turbid" atmosphere into the darkness of the universe. The sunset also is produced by the turbid medium; because of the thick layers of the atmosphere through which one looks against the glowing surface, the sun appears dark red. Although scientists have another explanation today, Goethe is altogether a masterly teacher of psychophysical optical effects, and I believe that we shall often refer to him during our future researches. By the way, his yellow-orange-red effect in combination with the "turbid medium" can be experimentally produced by placing white sheets of paper before an electric light bulb. More sheets produce a more reddish glow. The same effect can be observed on windows with drawn white curtains lit from behind. The bluish effects can be produced by laying either sheets of frosted glass or plastics or tracing paper over a black surface.

••• See his picture in the Detroit Institute of Art



Figs. 207 a, b, c. Close-up of the brush textures of the paintings of (1) Van Gough, (2) Seurat and (3) Cézanne

their palettes even more by using clear primaries in complementary pairs, yellow and blue, red and green.

But no matter how great the manual skill of the painter has been, he never could really duplicate the color effect of nature. The direct reflection and absorption showed always a more intensive value. For this reason, the prerennaissance painter did not even try to compete with such original effects by a servile imitation. He painted color relationships of greater intensity and produced an organic glow from within without any intent at deception. There, color became active not through the differentiation of reflection, or through the power of absorption of any particular material upon which light rays were cast, but through the planned action of the artist who brought the colors to the peak of their radiant potential by combining them solely in relation to each other. He knew about the vibrating quality of the complementary pair, green and red—caused by their contrast as well as the similarity of their grey values; he knew about the activity and clear legibility of the complementaries yellow and blue—because of the great contrast in their lightness values; and he knew a number of other physiological color facts. The prerennaissance painter was aware that it is not the use of the primary colors alone which gives the painting its radiant quality, since the strong colors may mix in the eyes to a neutral gray, but the mastered *relationships of the colors*, the shapes and their position within a certain area. It was here that the real conquest of color began. The same instinctive response to color led to the intense color scheme of Delacroix and later of the expressionists who finally freed themselves from the dominance of imitation and dared to employ color freely—without excuses.

VanGogh, in order to intensify his colors, applied them on the canvas in thick strokes as if they had been squeezed out of the tube. The pigment appeared as relief casting a shadow, while the edges were touched by light. Thus light and shadow were automatically drawn into the picture as a determining, qualitative factor, generating three values out of one hue. The original desire to give an illusionistic rendering of nature was here transformed into a color-light display, emphasizing the pure emotional and at the same time spatial properties of color and light. With this development the narrative, story-telling element in painting became more and more suppressed. This has made possible the development of contemporary painting where color is employed in its pure perceptual impact.

The neo-impressionists even dared to move toward a scientific objectivity in optical problems. At the end of the last century, Signac, Cross and especially Seurat preconceived the method of color photography as a new medium of expression by working with light effects. These painters, the pointillists, set small color dots adjacent to one another which produced, when seen from a sufficient distance the illusion of a broad, vibrating field of colored light. They created, from juxtaposed red and green dots a bright yellow, just as was done later in the autochromatic Lumière photographic plate and the Dufay color film. In support of their theory they adduced as evidence a discovery made by Ducos de Hauron in the year 1869 that the human

eye splits the spectrum colors, red and green, into minute points and visualizes yellow on account of the so-called additive admixture of colored lights.

Previous to impressionism, painters generally mixed color on the palette. They used mainly three primary hues, red, blue, and yellow, and could compose all other tones by mixing these pigments. This process is called "admixture by subtraction." The phrase means that each new mixed color becomes *darker* than the lightest color of any mixture. The darker color subtracts light from the light color.

Besides the primary *color* pigments there are three other primaries, the *light* primaries, red, green, and blue of the spectrum. The mixture of these light primaries is called "admixture by addition," because the new mixed colored-light—being the addition of the other lights—appears *more intensive* than the component lights. This can be verified by throwing the lights of different filtered projectors on one spot of a screen. The mixing of green and red lights will create yellow. This will be lighter than either the single green or the red. In contrast the admixture by subtraction of green and red pigment will produce not yellow but a dirty olive brown tone which will be less intensive than either the green or the red.

It is obvious that painters tried to overcome the insufficiencies of the subtractive admixtures. Different painters used different systems. Cézanne's system of achieving vibrating color schemes was similar to that of Seurat, only instead of dots he used fine strokes of various colors.

Renoir juxtaposed complementary red-green, blue-yellow spots to produce luminous color effects.

In all these pictures the eye accomplished the mixing of colors as it had done in the old Florentine paintings—with one essential difference. Until Seurat, painting was mainly the problem of using color to produce the illusion of volume in space. Seurat, possessed by the idea of vibrating light, employed color as an element of light symphonies. The shapes in his paintings were without detail and were used only as the carriers of a colored light structure. In this sense, Seurat is the great progenitor of the contemporary painter who brings a refinement to color relationships through visual devices which produce elemental impacts.



Colors have an endless variation because the hues may appear different through added properties such as the translucent, filmy, opaque, lustrous, mat, fluffy, and rough. Estimates as to the number of colors seen by the human eye have been made from time to time. The guesses range from a few thousand to ten million established (in theory) by the U. S. Bureau of Standards. Yet no system presents more than fifteen hundred sample color swatches for practical use. Although the spectrum consists of an infinite range of wavelengths, we resolve them into six to ten primary colors, following the psychological law of the threshold of optimum discrimination.

This means that while innumerable gradations of color exist, we tend to react to sim-

ple but strong sensations, and often we simplify what we see to prevent its throwing us into confusion.

The colors that have unique appeal to the average man are surprisingly few. The infinite physical diversity of color is a theoretical affair which, however, can be used as a stimulus to make the eyes see an increasing range of color.[•] The old painters generally worked with two complementary pairs, red-green, blue-yellow. Titian usually painted with four colors only, Rubens with seven. Mondrian used only three colors: red, yellow, and blue. When in the history of painting a new color was employed, for example, purple-red, to complement yellow, as in the paintings of Greco, it almost caused a revolution.

The fundamental perception of color is an inborn faculty in every human being. The appreciation of color depends upon the general psychophysical fact that man answers every color with its contrast, with its complementary. The eyes react to red with green, to yellow with blue. When children paint, without knowledge of rules, they always operate with a "color automatism"; they answer to every color or color group almost automatically with the complementary. This means that color harmony is the perfectly balanced condition of the complementary energies whereby the complementary to every color is the result of the physiological function of the eye. This law has been the ruling scheme in painting at all times despite the fact that it was frequently buried beneath symbolic and associative values. Even if the complementary pairs are missing from a painting and only single colors are used, the potential energy of the complementaries vigorously acts in the unconscious mind.

Of course, painters employed not only color complementaries but other elements as well, such as black and white contrast which holds a dynamic energy. At the cinema, the eyes often react to white titles on a dark background by reversing the lettering to black on a light background. This is the so-called after-image.

Complementaries that are considered "harmonious" entities exist in all color systems. But in spite of a rich nomenclature and other contributions to the problem, nobody has been able as yet to work out a valid canon of color harmony. In fact all color harmony systems concerned with pigments differ from each other, all defining a different number of colors and with them the complementary pairs. Newton spoke of seven colors, Goethe and Schopenhauer of six, Ostwald of eight, Munsell of ten. Goethe defined the primary complementaries as yellow-redblue; blue-redyellow, purple-green. Ostwald defined them as yellow-ultramarine, iceblue-orange, red-seagreen, violet-leaf-green. Munsell stipulated the complementaries as yellow-purpleblue, blue-yellowred, red-bluegreen, redpurple-green, purple-greenyellow. Newton only once mentioned a

[•] *In one of my pictures I tried to achieve six white shades though besides the white canvas color I used only one white pigment. The other whites were the result of visual illusion produced within areas outlined with pencil and india ink as well as by transparency effects. Tests showed that the variations of white were seen only by people experienced in color perception. Refinement in color perception is prerequisite to rich plastic experience.*

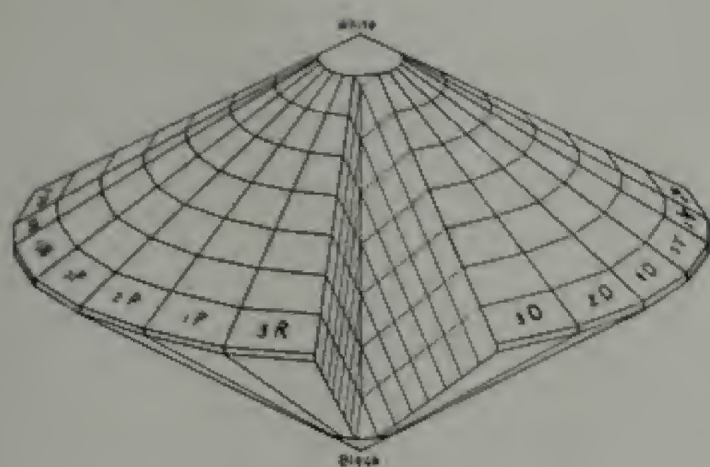


Fig. 208. Ostwald Color System
The complete circle contains 24 hues, with the psychological primaries, (red, yellow, sea green and ultramarine blue) and their secondaries (orange, leafgreen, ice blue and purple) as a basis

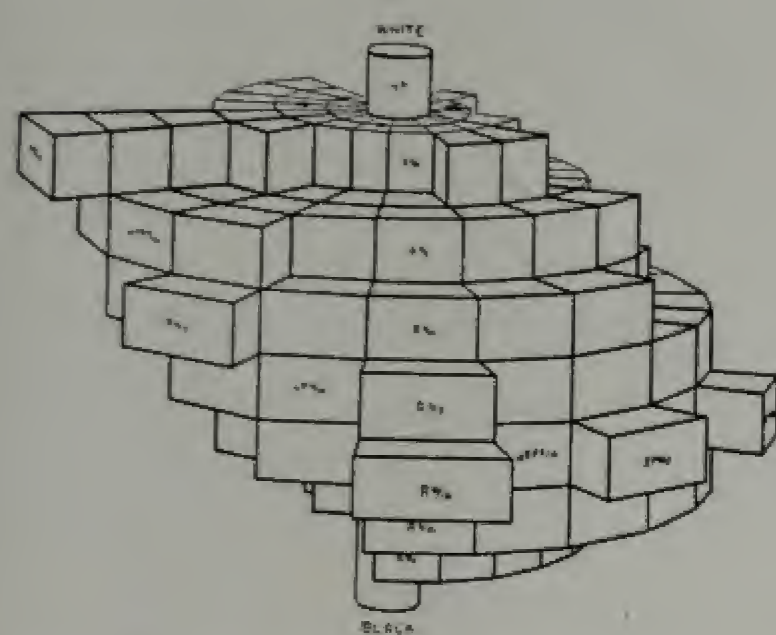


Fig. 209. Munsell Color Solid
This is but one of several ways in which the system may be illustrated. Light colors appear at a level near white, and dark colors at a level near black. Intense hues extend farther from the gray scale than pale colors

complementary pair; gold-indigo. This proves that in spite of the universality of the law of complementaries, we have thus far been unable to define exactly with the unaided eye the complementary color pairs. The usual explanation, that their mixtures give a neutral gray, is a very subjective test, in the light of scientific colorimetry.

Green-red, blue-yellow are the basic complementaries generally seen in occidental paintings. But these color pairs, if analyzed, show delicate differentiations in the works of the various professional painters. This fact means that every painter in the past has had his own interpretation of complementary harmonies. The differences of the interpretation created the peculiar and unmistakable "quality" of the individual painter.

We have to reckon with a new phenomenon which up till now has received but little attention. Today a great part of our life is lived with electric light, and since the composition and the spectrum of this light differ from that of sunlight, the well-known effects of classical color harmonies will have to undergo various transformations. The color objects, draperies, folds and all other shadows, are changed by the influence of electric light. We learned from Goethe that objects lit by colored light produce shadows in their complementary color. For instance, an object lighted with red throws a green shadow (if some white light is used as well). This was an important element in the illusionistic stage design of the first quarter of the century and it can again become important in abstract colored motion pictures. In old stage performances the scenery was painted according to this principle with shadows in violet, green or red, in order to produce a perfect match to the yellow, red and green filters of stage lighting. Similar results meet our eyes today in the illumination of music halls, variety shows, circuses, bars, night clubs, outdoor advertising, lit by fluorescent and neon tubes.

The eye, trained for centuries to observe the shadow effects of daylight as interpreted by painters, now sees the real complementary light contrasts, physically pure. This seems to be of great importance though we are not yet able to tell what the consequences will be. At the moment, experience shows rather the opposite: these light effects when reproduced with pigments are offensively shrill. This is a surprising result. One may ask: Will it be possible to do anything artistic with the purely physical complementaries, or shall we again have to fall back upon the subjectively interpreted daylight effects? I do not think that the solution lies in this restriction. All achievements of civilization and of art came rather slowly. Certain tones—such as rose and colored grays—came into use as important elements in painting at a rather late stage of each cultural cycle apparently requiring matured power of discrimination.

"The first period of cave painting knows only black and red outlines.

"The third period uses solid black, red and brown for the surface and employs a pigment to get an effect of relief. Outlines black, body of animals modeled by smearing on it various tints obtained by mixing red and black. Introduction of red variations: tannish red, orange red, sepia. First traces of mixing color with white.

"In *Egypt* the oldest class of painting is vase painting (5000 B. C.). It shows white lines on hand-burnished red. The combination of a rich red with highly reflecting black is the first satisfying use of a color scheme in Egypt.

"Dynastic times (starting 3400 B. C.) started flat painting on walls with a color scheme of black, red, yellow, green, white.

"The fifth Dynasty introduced blue and gray (ca. 2000 B. C.)

"The twelfth Dynasty introduced violet.

"The eighteenth and nineteenth Dynasty, the last great period, uses as main colors terra cotta red, black, white, dark brown, (nile) green, blue, yellow. New is the dotting of blue with black, green with yellow and the iridescent shades.

"In *Crete* the early Minoan period (3400-2100 B. C.) shows only red wash.

"The First Middle Minoan period (2100-1900 B. C.) red, black, white.

"The Second Minoan period (1900-1700 B. C.) red, blue, black, white.

"The Third Minoan period added gray.

"The late Minoan period (1500-1300 B. C.) shows rose, gray-blue, red-brown, creamy white, and the use of transparency for women's garments. Through all Crete periods red and black are predominant.

"The frescoes in the palace of Menelaus in *Tyrrhene* 2000-1000 B. C. show the first use of pink.

"Early Mycenae frescoes show the repetition of the color scheme red, black, later white.

"On the *Greek Mainland* down to the 6th century the main colors are black, white, red and yellow.

"Demokritos described in his two treatises: 'On Color and On Painting' the work of the 5th century painting as consisting of four colors from which the others were obtained: red, yellow, black, white. Gold is derived by mixing white and red with a touch of yellow, purple is made from red, black and white (3 parts of red, 1 part of black, 2 parts of white); indigo by mixing black and yellow; green from yellow and purple, etc. The old Greeks knew 819 shades mixed of these four basic colors.

"Greece in the age of the Tyrants (600 B. C.) used red for bodies, blue for hair. The 5th century started attempts in shading.

"The 4th century started the struggle with the third dimension.

"The 3rd and 2nd century knew all about space, color and light, and no landscaping.

"*Roman* painting followed the Greek tradition.

"Pompeian wall painters first used superimposition of color to get a multicolor effect. Over a layer of black they laid a red layer and obtained by this method a rather deep, brownish red, effect.

"Known colors up to the end of the Roman empire were the earthcolors: red ochre, terra verte, umber;

lead colors: white lead, red lead, yellow oxide of lead, copper, applied with vinegar;

lampblack, burnt ivory and charcoal;

blue was carbonate of copper;

vegetable and animal dyes: purple, madder (red and yellow), indigo, kermes (scarlet), woad (blue).

"The only important colors *modern times* added to the classic color scheme were ultramarine and lapis lazuli."

(This passage from "Ancient Painting" by Mary Hamilton Swindler, is a revealing historic account of color discrimination and usage.)



The purely automatic harmonies which are created by light projection will probably undergo a similar process of step-by-step development of artistic appreciation. The individual painter's approach to the difference between the objective, physically pure perception and the classical subjective perception will make up to a large extent the content of painting for a long time to come.

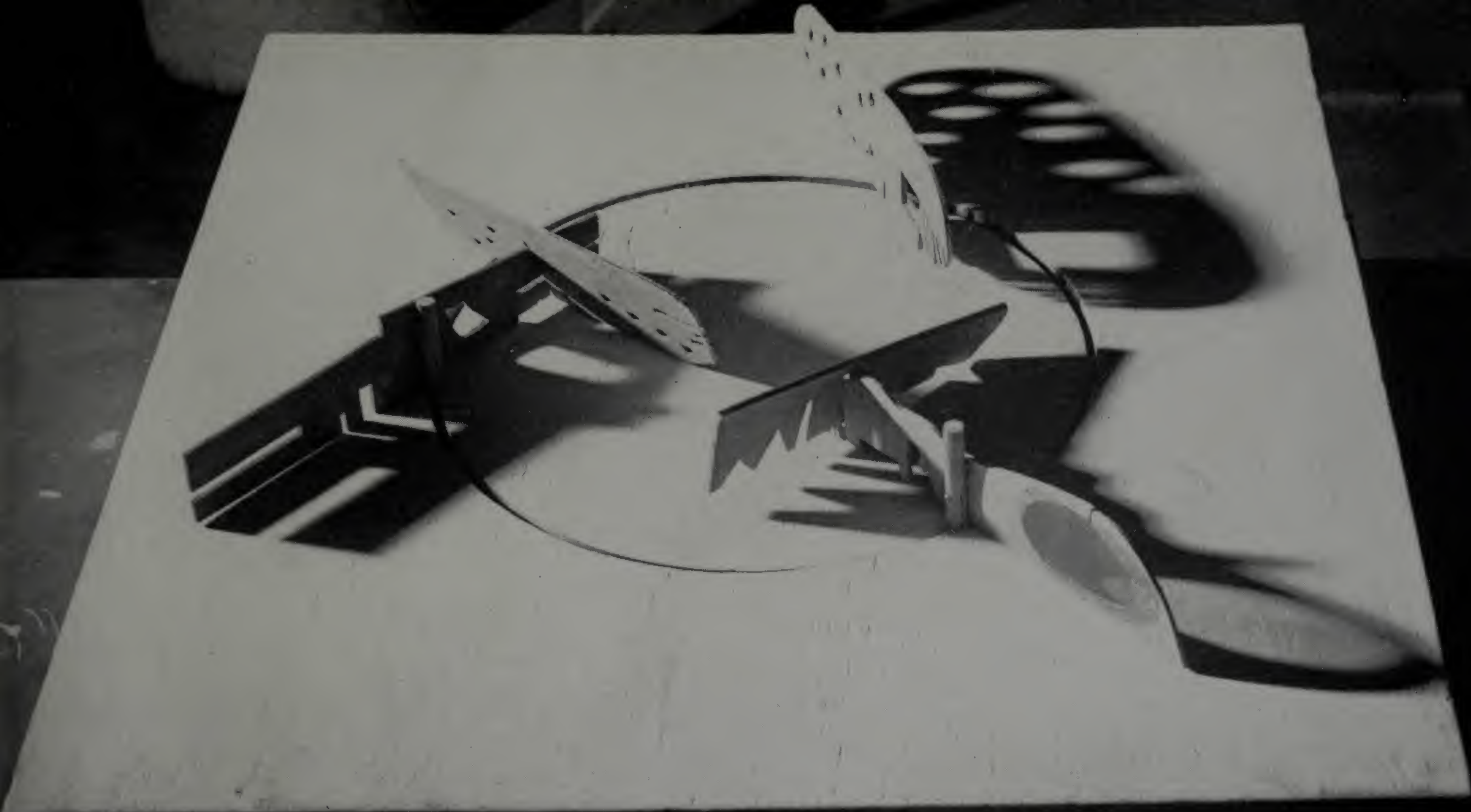


Fig. 210. O Nathan Lerner, 1941

Model of a colored light fresco

The three flags and perforated constructions on the perimeter of the circle move around the circumference of the large disk and at the same time around their own axis. The result is, if lit with colored spotlights, a fantastically rich, colored light display

from pigment to colored light

The progressive painter who is struggling with his traditional element, pigment, feels that very soon a transition will come, a transition from pigment to light. The knowledge for this undertaking can hardly be acquired accidentally. It must be based partly upon scientific research and a new technology. Unless the painter learns to clear his mind of clichés, he will not reach the goal of genuine creation with light. The pedagogic value of manual pigment painting is not to be denied. But in the future such painting will not retain its exclusive monopoly.

“Painting with light” is an old chapter in artistic Utopias. There are reports of



Fig. 211. O Myron Kozman and Gordon Webber, 1940

Light painting

This "painting" was made from two wire-mesh screens crossing each other at a 90 degree angle. Over the wiremesh colored cellophane layers were cemented. The construction, lighted with spotlights, revolved throwing everchanging colored scenes on a screen

Fig. 213. O L. Moholy-Nagy, 1942

Handshaped plastic

By heating, the themoplastics become pliable so that compound curvatures, concave and convex shapes can be created. The result is constantly changing relationships between the painting and the clear background, the introduction of highlights, shadows and reflections which, with the traditional means of the painter, hardly could be achieved

Fig. 212. Irene Rice Pereira, 1945

Radium Diagonals

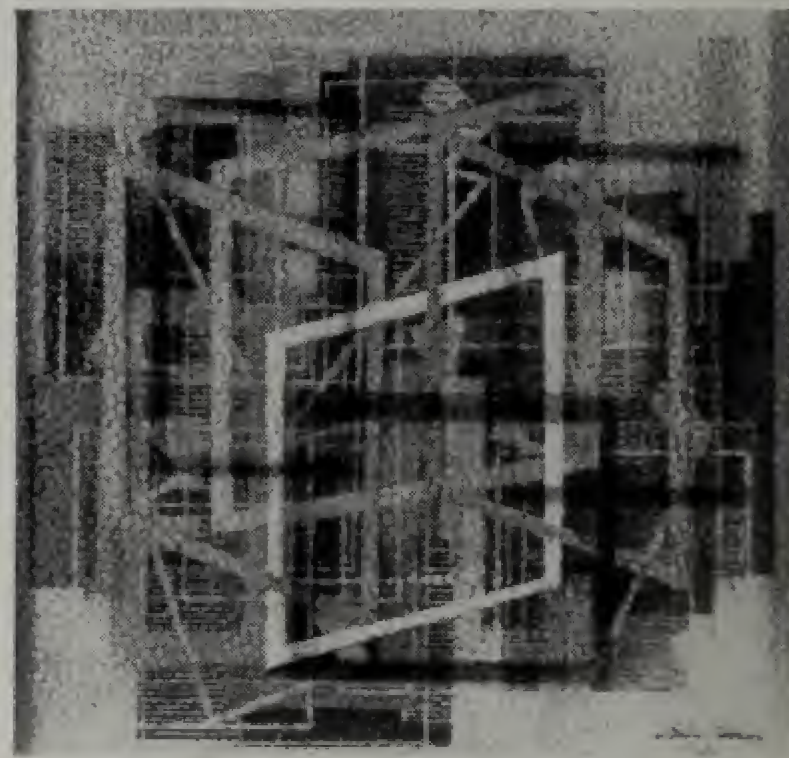
The painter comments: "This painting is in two physical planes, but three surfaces were used.

Front surface—hammered glass which creates the diffraction of light.

Second surface—finely textured glass with open planes in various directions made with a permanent porcelain cement and silver leaf.

This surface is flat over scratchboard.

Gouache was used on the scratchboard with incised lines and radio active paint"





antique illumination of theater performances by pitch, oil and candle which often were enhanced by colored glass chips and prisms. Centuries later appeared the magic lantern, the fireworks, the light effects of the baroque opera. Today there are more technological sources for light painting than at any other period of human history. We have light signs, light displays, color organs. But this is not yet the age of light painting. It is only the hour of light advertising, serving publicity, to catch the eye; to shorten an interval; to fill mental gaps. Today motion is admired, used mainly to satisfy the novelty craze for raw speed. Our culture provides blind motion in the incessant electric arrow and in the movies, perfect symbol of this vicarious age. We have not yet institutionalized the space-time of our physical universe. In fact, the modest attempts of modern artists to embody space-time into their work stand in danger of being lost in the flashy chaos of the superficially used light and motion. Light is still used without planning, as in crossfires of searchlights, sky projections, and neon light extravaganza. But still the existence of even such lightforms holds promise for the future. There, light as a new medium will infuse vitality into the ever-recurring problems of life to which the painter will address himself. It will bring forth a new form of visual art. And as we go forward from painting with brushes and pigments toward painting with instruments and light, there must be confidence that the achievement will not impair the directness nor lower the spiritual level of painting.

Now everything is in the first stage of rediscovery. Past and present are overlapping. The painter must know his old craft but he has to become familiar with colorimetry too, with wavelengths, purity, brightness, excitation of light and the manifold possibilities of artificial light sources. Then it will become obvious that the physiology of the eye is more closely related to the pure light of the spectrum than to the crude pigment mixtures of the palette.

The new painter already shows in his pigment work a tendency to employ strong, unadulterated harmonies and unmixed hues, proving that color consciousness is in a process of evolution. This is allied with the new methods of light production—the electric light—and a new technique of color presentation. But certainly more scientific facts about the nature of color observations should be available than are now presented by the different color systems. This knowledge must become part of the artist's practice. Many painters already use re-evaluated psychophysical effects such as optical illusions, changes in size, automatic complementaries, halo effects around negative shapes, new relations of hue, chroma, and value. But to enhance the radiance of color, besides these, more experiments are needed—with polished surfaces, with translucencies which allow a combination of pigment and direct light effects.* The next step is the conscious and general use of reflections, diffused and transparent, solid and open shadows, mirroring, refraction with prism, with grating and interference of light. There should be mentioned, also, other forerunners of a light-graphic; that

* See my *"Abstract of an Artist"* in the third edition of *"the new vision"* (Wittenborn & Co., 1946, N. Y.)

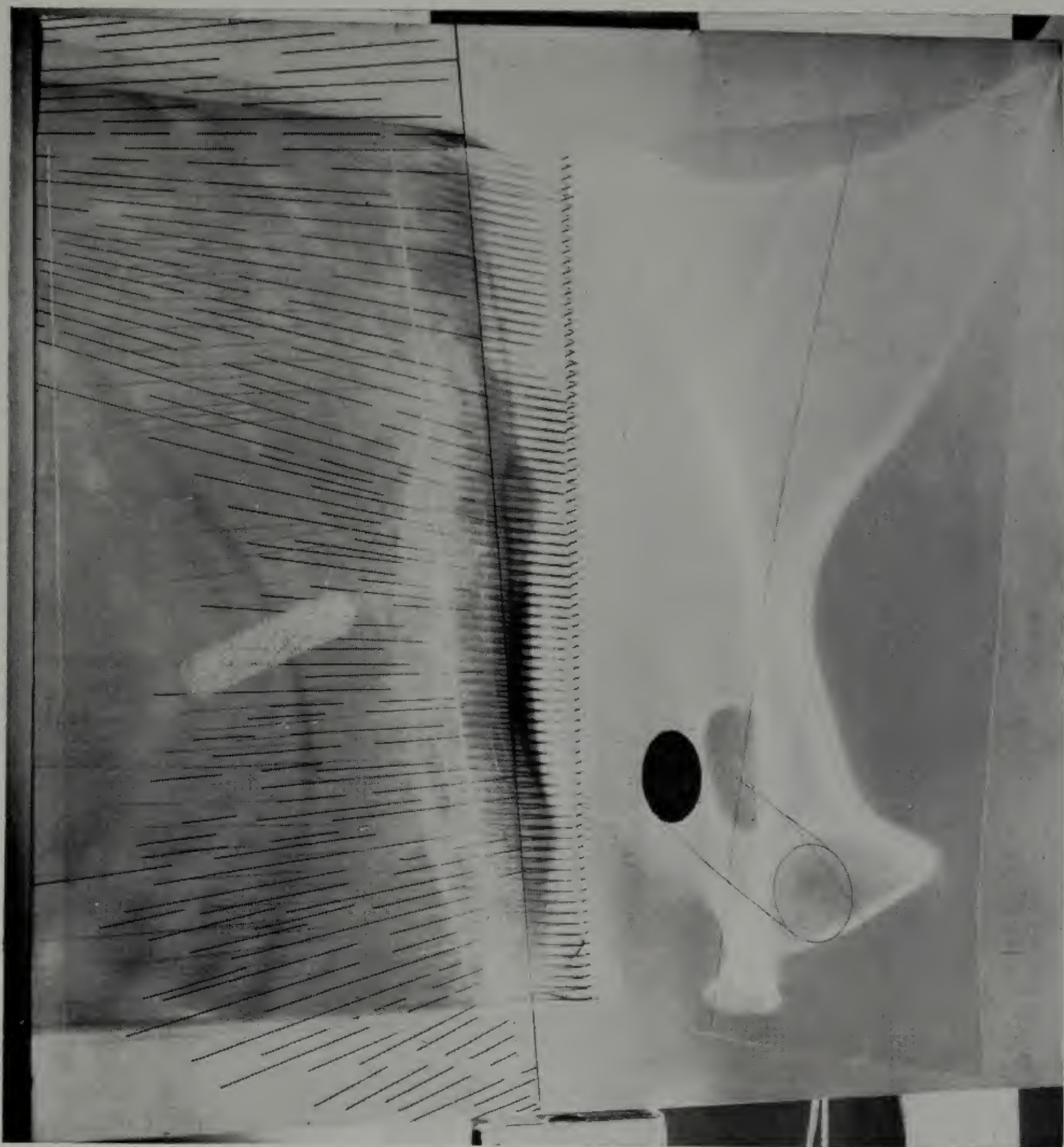


Fig. 214. ○ L. Moholy-Nagy, 1936

Light painting

The slight warpage and motion of the hinged celluloid sheets produces a combination of reflections and shadows on the background and the pigmented surfaces of the wings achieving an effective combination. Here the solid textures of the "collage" have been translated into a "light texture"

is, floodlight, luminescence, phosphorescence, ultraviolet, infrared, polarized light, cathode and x-rays.

Since the 18th century, many persons have been working in this direction: Pater Castel, Hoffman, Rimington, Scriabin, Hirschfeld-Mack, Thomas Wilfred, Raoul Hausmann, Maurice Wetzell, Alexander Laszlo and many others. Each constructed or planned a more or less surprising 'color organ'. Viking Eggeling has been the pioneer for the black-and-white abstract film. Picabia, Léger, Fishinger, Ruttman, and I tried to solve some of its problems. The next step will be to produce such films in color. •

Most of the visual work of the future lies with the "light painter". He will have the scientific knowledge of the physicist and the technological skill of the engineer coupled with his own imagination, creative intuition and emotional intensity. It is difficult to go into details yet, but in the coming experiments, research in the physiology of the eye and in the physical properties of light will play an important part.

"optophonetic"

Nothing is achieved without effort. One must never become tired of observing the simple or rich phenomena of light and color offered by the daily routine at home, on the stage, in the street and in the laboratory. One must explore their genuine characteristics, their peculiar qualities. Then all endeavors will point—as Raoul Hausmann previsioned—in one direction, to an optophonetic art. This will allow us to see music and hear pictures simultaneously: a startling articulation of space-time. The first steps to it—a mural art of this age—lead most probably through photography, cinema and television.

• *The first part of Disney's "Fantasia" was such an attempt. Unfortunately it was later cut out of the film in the false belief that the public was not ready for it. The public here, as in so many other cases, is used as a scapegoat for the producers' own incapacity to sustain a genuinely artistic concept.*

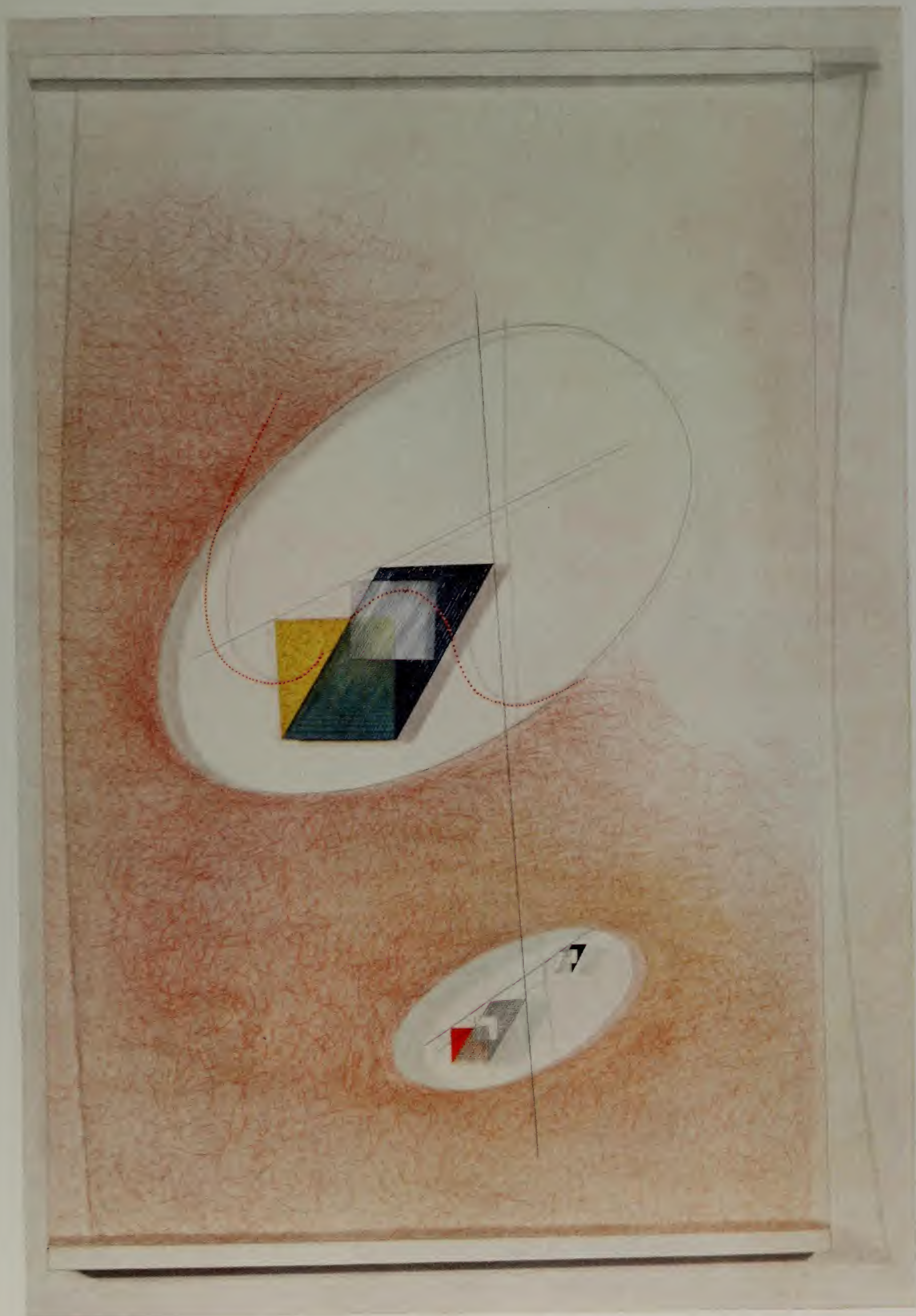


Fig. 215. ○ L. Moholy-Nagy, 1940 Space Modulator (plexiglas)

photography

Through the use of color photography, through the mechanical perfection of the means, the range of the tone reproduction of colored light has become infinitely enlarged. This provides the raw material for the creative color photographer for expressive purposes.

The main problem of the color photographer today is to build up a new thinking in the use of his means. Color photography requires the reeducation of the mind as well as the eye. Instead of concentrating on esthetic values derived from painting with pigment, the photographer must free himself from the observation results of the painter who could report only about a few among the innumerable light phenomena. (The painter has chosen, namely, the ones which he could best translate with his manual technique, with pigment on canvas—leaving others, the more complicated ones, aside.) This means, practically, that the photographer has to think in terms of light and must return to direct light effects as his primary source.

color photography

One would think that color photography, the new frontier of photography, offers the ideal means for “light creation” since everything can be recorded today in color with the utmost delicacy. Indeed, this is one of the outstanding characteristics of color photography, namely, its ability to record objects in nature so exactly that even the air layers and haze between the camera and scene, as well as the changing colors of the day are captured. However this distorts the original meaning of colors by laying the same casual “tinge” over all of them. This is additional to the distortion which the chemical emulsion introduces. The emulsion, which is the carrier of all photographic colors, yields only artificial primary color layers, only approximations of the true spectrum primaries. Because of their synthetic nature they produce a boringly unifying “complexion” of the color photographs. In other words, one color photo—for the time being—looks rather like the other. In comparison to such shots, good abstract painting—with its color values determined by the artist—appears infinitely superior.

There are a number of other problems too. By projecting color slides on the screen, the blue or other monochromatic “haze” of the usual shots will be mixed with the overwhelmingly red-yellow light of the projector bulb, causing additional color distortion although—officially—they are “balanced” to allow for this effect of the incandescent illumination. But the main difficulty at present is that the usual problems of color photographers, no matter how complicated, have been solved by the painters of the past. Most photographers, however, are quite uninformed and happily consider their own “discoveries” as original inventions.

Color photography will come into its own only if the photographer is visually well educated and understands painting as well as the unique characteristics of his

Fig. 216. ○ L. Moholy-Nagy, 1935
Dufay Color photograph
(Light filtering)





Fig. 217. ○ L. Moholy-Nagy, 1942
Color variation of part IV of the motion picture "Light Display: black and white and gray" (Scenario pp. 288, 289)

own medium, its new and genuine "quality". Then he will be able to begin with *fundamental* experiments. This justifies the hope that indigenous results can be developed as the work progresses.

Among the significant properties of color emulsion and of the photo apparatus is the ability to mechanically reproduce fleeting light and colored reflections as well as colored shadows (such as Goethe's complementary shadow effects) so that the translation becomes ethereal, not pigment but colored light. In the past these could neither be observed thoroughly by the eye nor recorded with exactness and true quality by the easel painter. And exactly there is the territory of new and exciting promise.

It is also possible to present color-light values not in order to create an illusion of a naturalistic scene but to build up a new feeling of space through different colored lights within a colored light display, as they appear, for example, in the "light box". Promising experiments can be made with color filters, especially if some white

Fig. 218



Fig. 220



Fig. 219

Fig. 221

Fig. 218. ○ L. Moholy-Nagy, 1945
Path of motion during a dance
The camera shutter was open and the color film exposed while dancing, relating this motion to the light sources in the room

Fig. 219. ○ Gyorgy Kepes, 1943
A walk on Michigan Boulevard, Chicago, towards neon light billboards

Fig. 220. ○ Dorothy Forsberg, 1944
Virtual Volume
While in Figs. 218 and 219 the camera was moving while exposing the film, this color shot was taken of moving objects in a light box with a stable camera

Fig. 221. ○ J. B. Foley, 1940
Experiment in the light box
One of the difficulties in color shooting is the mastery of clearly circumscribed small color areas. Colored light is generally produced with monochromatic color filter placed over the light source—but if employed, the filtered colored light envelopes everything. In the light box (as it is described on pages 198-199) an exact control of the color areas can be maintained. Fig. 221 demonstrates this. The photograph was taken of a bent piece of plywood lighted with different colored spotlights through little holes in the side walls of a light box



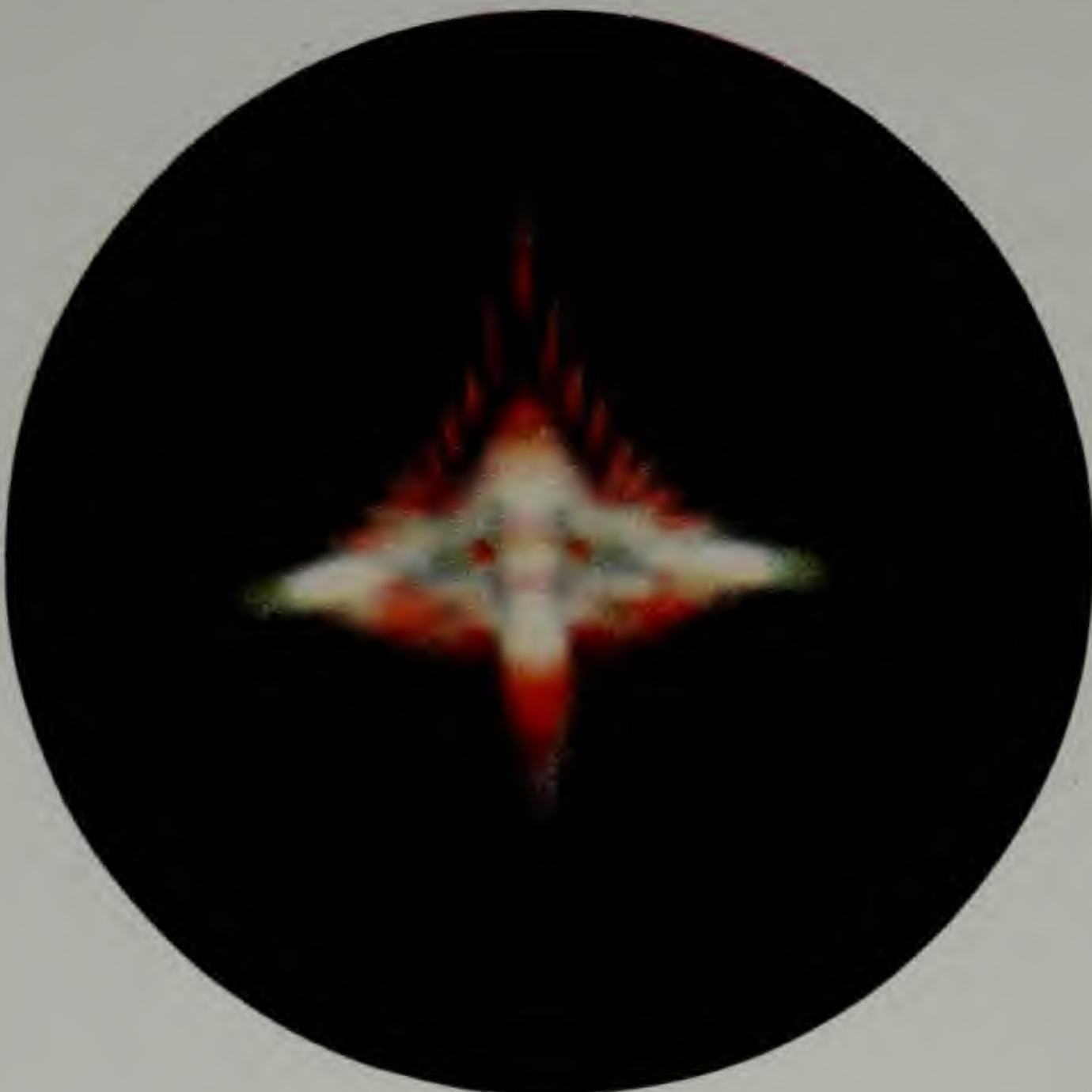
These examples show an investigation of the genuine properties and behavior of color photography

areas can be kept free from their effect. Extreme close-ups are another good departure since they effectively concentrate light on a small area. Superimpositions, colored motion diagrams of fireworks, the pattern obtained by walking toward moving car-headlights or neon signs are also fruitful experimental problems. The supreme promise however remains the mastery of color photograms.

The true *kinetic* representation of color-light values will bring the first great sensation of direct light display. Continuity and composition will be established through the direct impact of purely optical laws and visual fundamentals—not by sentimental content. Naturally, much time will elapse before color photography and the motion picture will reach the point where color will be divorced from the usual naturalistic-illusionistic meaning; where color will be understood for its own sake and not as a sign or symbol representing an object. The creation of colored shapes through light, freed from such content, will probably lead to the abstract cinematograph, the kinetic equivalent of the static color photogram.

Such photographic experiments in color as shown in Figs. 216-223 promise a future development, that is, the controlled and fascinating work with colored light. However, we have to know much more about the medium, its physical and psychological effects, its chemistry, and about the sensitiveness of the emulsions provided by laboratories to record the visible and translate the invisible part of the spectrum into color.

For example, Kodachrome film seems to be sensitive to invisible ultraviolet light, recording it as blue. For this reason Kodachrome skies photograph more blue than natural skies. Such—and may be more subtle—effects may influence everything the camera sees. A requirement for the color photographer must be then to master this abc of light in the same way the painter masters his abc of color.



Figs. 222 a, b. Eastman-Kodak, 1945

Test diagrams of a series of lens elements

A photographic lens consists sometimes of as many as seven elements. Their surfaces must be ground and polished within a $\frac{1}{2}$ light wave— $1/100,000$ of an inch—of perfection. These elements are then assembled in a lens mount and inspected for performance. In this inspection, rays from a pinpoint of light, about 200 feet away, pass through the lens on the inspection bench. Examined through a powerful microscope, they appear as a star

The symmetrical, "good" star was formed by a lens at a point 11° "off axis". If a lens fails to bring the light rays into good focus at all points, the star lacks symmetry and definition—the faults seen in the "bad" star (right)

Such, and many other, scientific experiments (especially with polarized light) will have a bearing upon the future dictionary of the color photographer

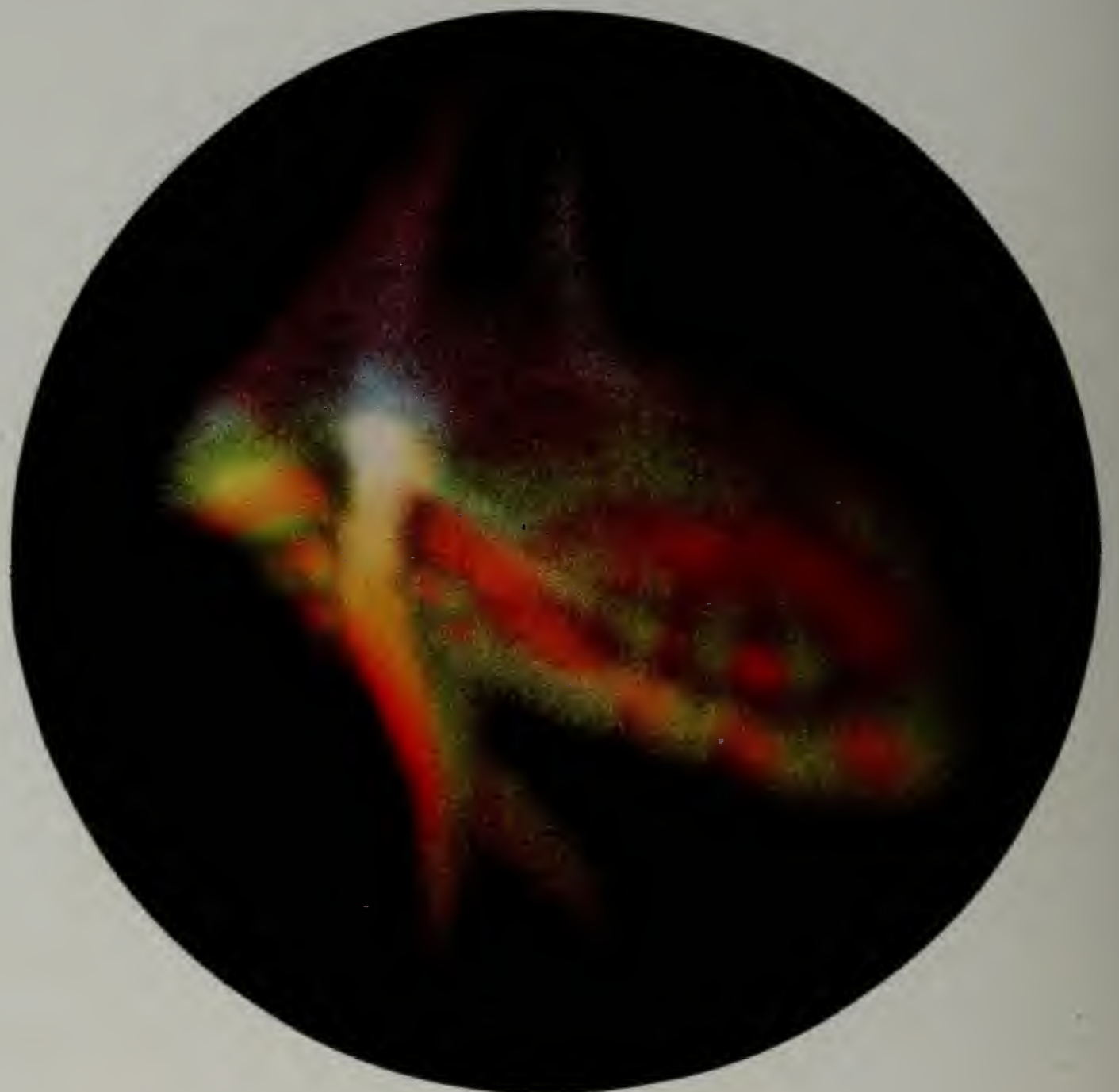


Fig. 223. F. W. Goro, 1945

Seven photographs of a railroad worm. The South American railroad worm is a wonderful little creature which lights up like a theater marquee when it is excited. It has one red light on its head and twenty-two greenish-yellow ones along its body. The railroad worm was so named because its lights look something like railroad signals. It is actually not a worm at all, but the grub of a beetle which lives in Uruguay. The railroad worm is of much interest to men who study the luminescence of insects. Dr. E. Newton Harvey, a noted Princeton physiologist, has three or four of them brought to the United States by plane every year. One of Dr. Harvey's railroad worms, pressed seven times with a sheet of color film by "Life" photographer F. W. Goro, made the self-portraits—shown on the opposite page—with its own lights

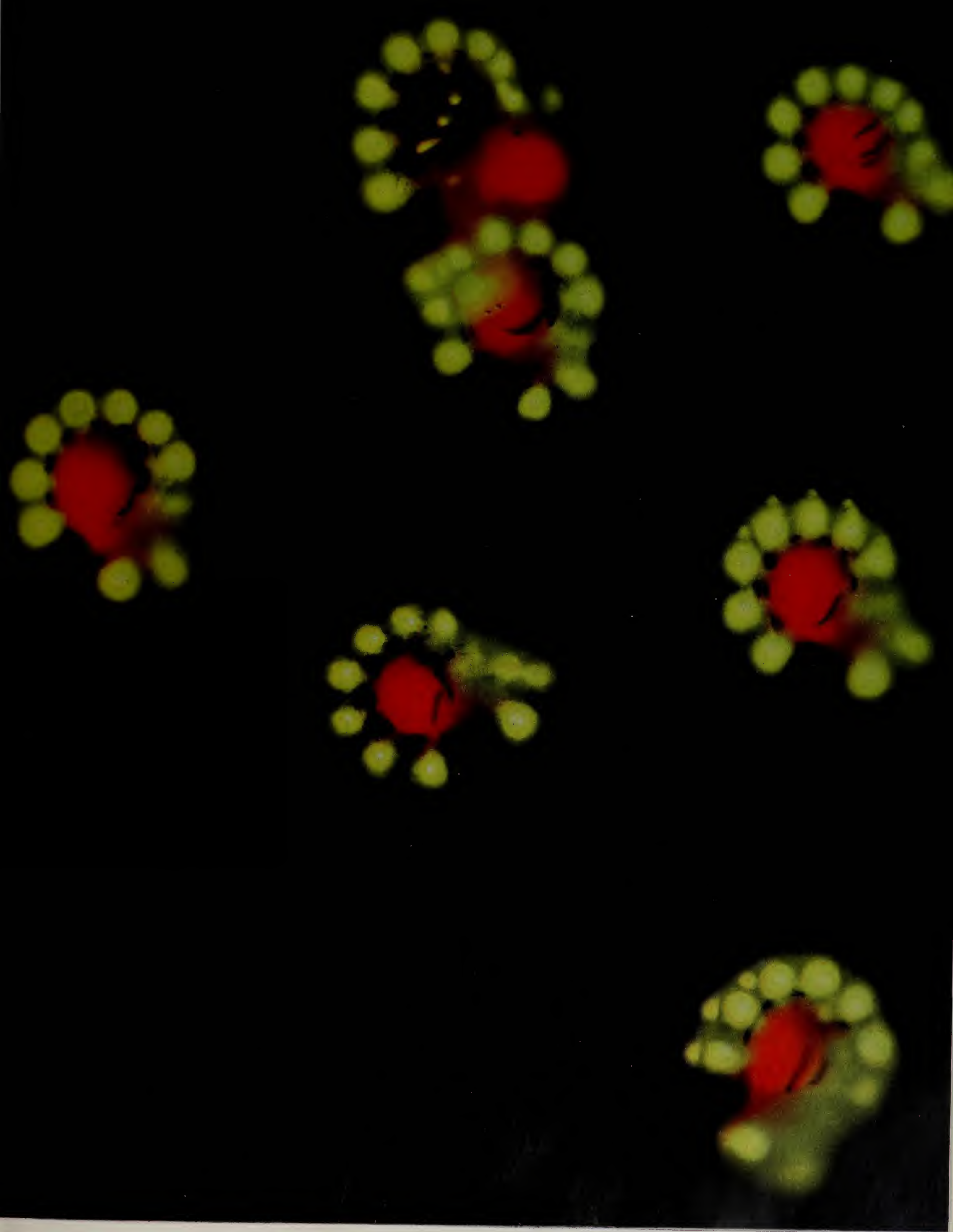




Fig. 224. Samuel Wu, 1945

Seven exposures

The rich diversity of color is due to the use of color filters placed in front of one 500 watt spotlight. One model hand was used against a black background for three

exposures—the camera was moved slightly and two more shots were made. Then the whole setup was removed and the yellow spot was exposed on a white background. The black background was replaced for the last exposure—the frame

Fig. 225. O Nathan Lerner, 1940
Eye on nails
(photomontage without scissors)



black and white

Photography is a new medium of expression. Since its working rules have not yet been frozen into unalterable dogmas, it has experimental potentialities. Moreover, by analogy, one may find clues, may approach other media with fresh insight. In fact, it can be assumed that the analysis of photo, drawing, painting, would prove mutually illuminating.

In the official history of art, photography was for a long time considered only a mechanical means of recording. Being mechanical, it was argued, it could not produce art. And when any interpretation tried to elevate photography to art, it was with the esthetic-philosophic concepts customary in the definition of painting. That is why photography with conscious "art" ambitions has remained in rather rigid dependence upon the traditional forms of painting and has slowly passed through the successive stages of all the various art "isms." But fundamentally new discoveries cannot long be confined to the mentality of bygone periods. When that happens all productive activity is arrested. This was plainly seen in the photography of the last hundred years, which has yielded little results save as a sort of visual stenographer to science, criminology and journalism. But at least in these fields photography has been used with a knowledge of its working conditions, its science and technology, optics and chemistry; in other words, with a knowledge of its basic elements. Here photography proved to be the pioneer of an original development peculiar unto itself, unconcerned with whether it was called "art" or not.



Fig. 226. ○ L. Moholy-Nagy, 1928



Fig. 227. ○ Lewis Fay, 1939

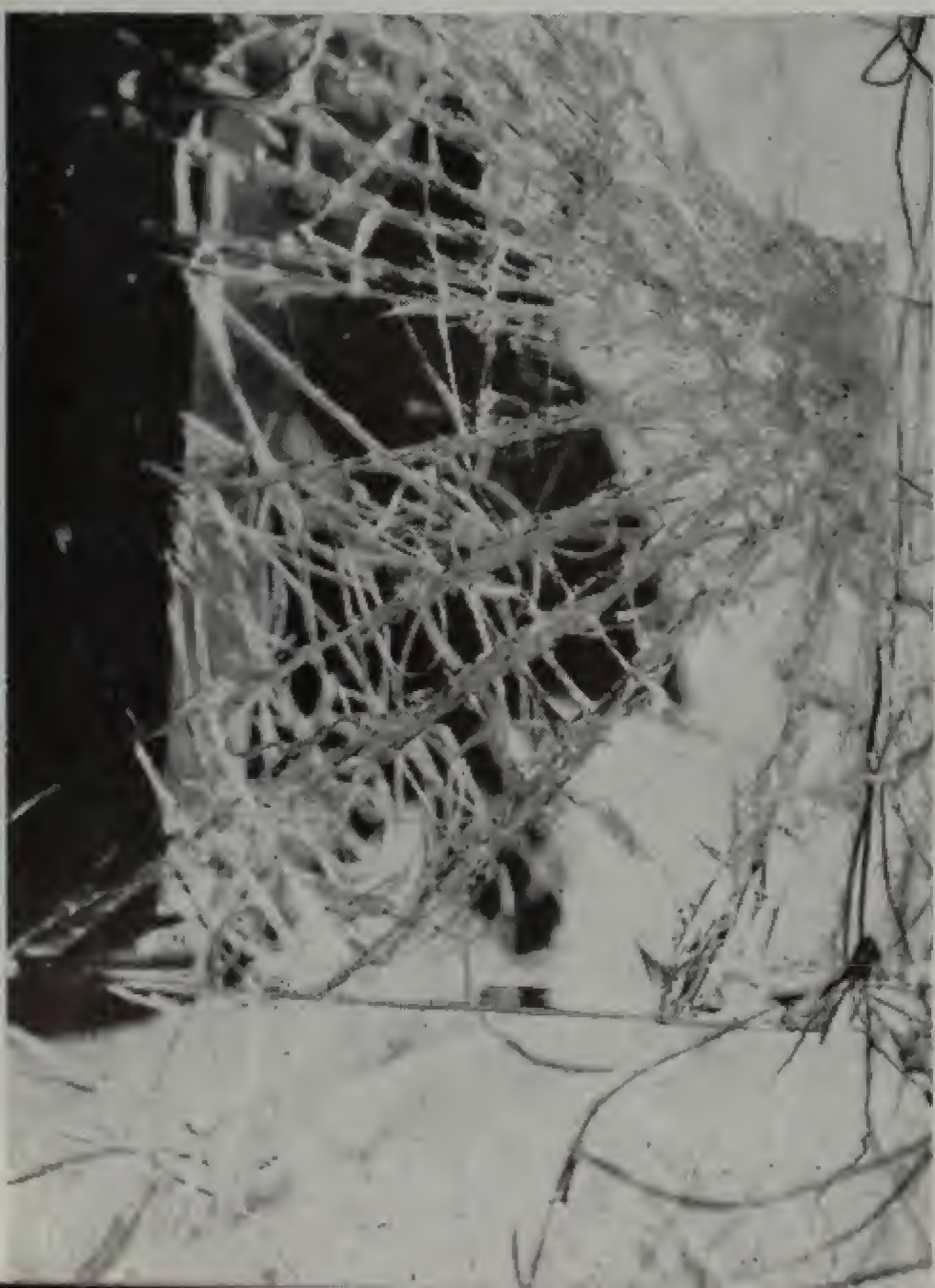


Fig. 228. ○ William Keck, 1939

Photography has not yet achieved anything like its full stature, has not articulated its own intrinsic structure. Yet this lack of "results" does not contradict the almost unbelievable impact which photographic vision has had upon our culture. It is unprecedented that such a "mechanical" thing as photography—regarded so contemptuously in the creative sense—should have acquired in barely a century of evolution the power to become one of the primary visual forces in our life. Formerly the painter impressed his vision on his age; today it is the photographer. One has only to recall the romantic outlook of former generations upon the pictorial presentation of landscape and other objects, and compare it with the way they are perceived now, namely, "photographically". Many people may not realize it but the present standard of visual expression in any field, painting, sculpture, architecture and especially the advertising arts, is nourished by the visual food which the new photography provides. There is the incisive sharpness of camera portraits pitted with pores and furrowed by lines; the air-view of a ship at sea moving through waves that seem frozen in light; the chiselled delicacy of an ordinary sawn block of wood; the close-up of a woven tissue; the whole of rarely observed details of structure, texture and surface treatment of whatever objects we care to choose within the realm of the traditional, monocular viewing and rendering of the world.

All these characteristics are not altogether dissimilar to those of naturalistic painting with its imitative rendering. But as in painting so in photography we have to learn to see, not the "picture", not the narrow rendering of nature, but an ideal instrument of visual expression. If we can see in the genuine elements of photography the self-sufficient vehicle for direct, visual impact based upon the properties of the light sensitive emulsion, then we may be nearer to "art" in the field of photography too.

photographic quality

Black-and-white photography revealed for the first time light and shadow in their interdependence. The development of reliable artificial illumination, like electricity, brought an increasing adoption of flowing light effects and richly graduated shadows. Through these elements a greater animation of surfaces and a more delicate visual intensification was possible. This multitude of gradations is one of the fundamental "materials" of photography. This fact holds true even when we pass beyond the immediate sphere of black-white-gray values and begin to think in terms of color.*

Through the black-white-gray reproduction of colored subject matters photography has enabled us to recognize the most subtle differentiations in both the gray and chromatic scales; differentiations that produce a new and hitherto unobtainable quality of visual renderings. This is only one element among many. But it is the point

* A device to dispel poster-like effects and create a more delicate and melting impression is to use color in conjunction with the intermediate tones. When pure color is placed against pure color, plain tone against tone, a hard, decorative, poster-like effect generally results. Late cubism, neoplasticism and constructivism tried to overcome exactly this deficiency and this effort became an important part of their "problem area". This is one clear occasion in which photographic experiment lent an insight to painting.



Fig. 229. Berenice Abbott, 1944
Termite building



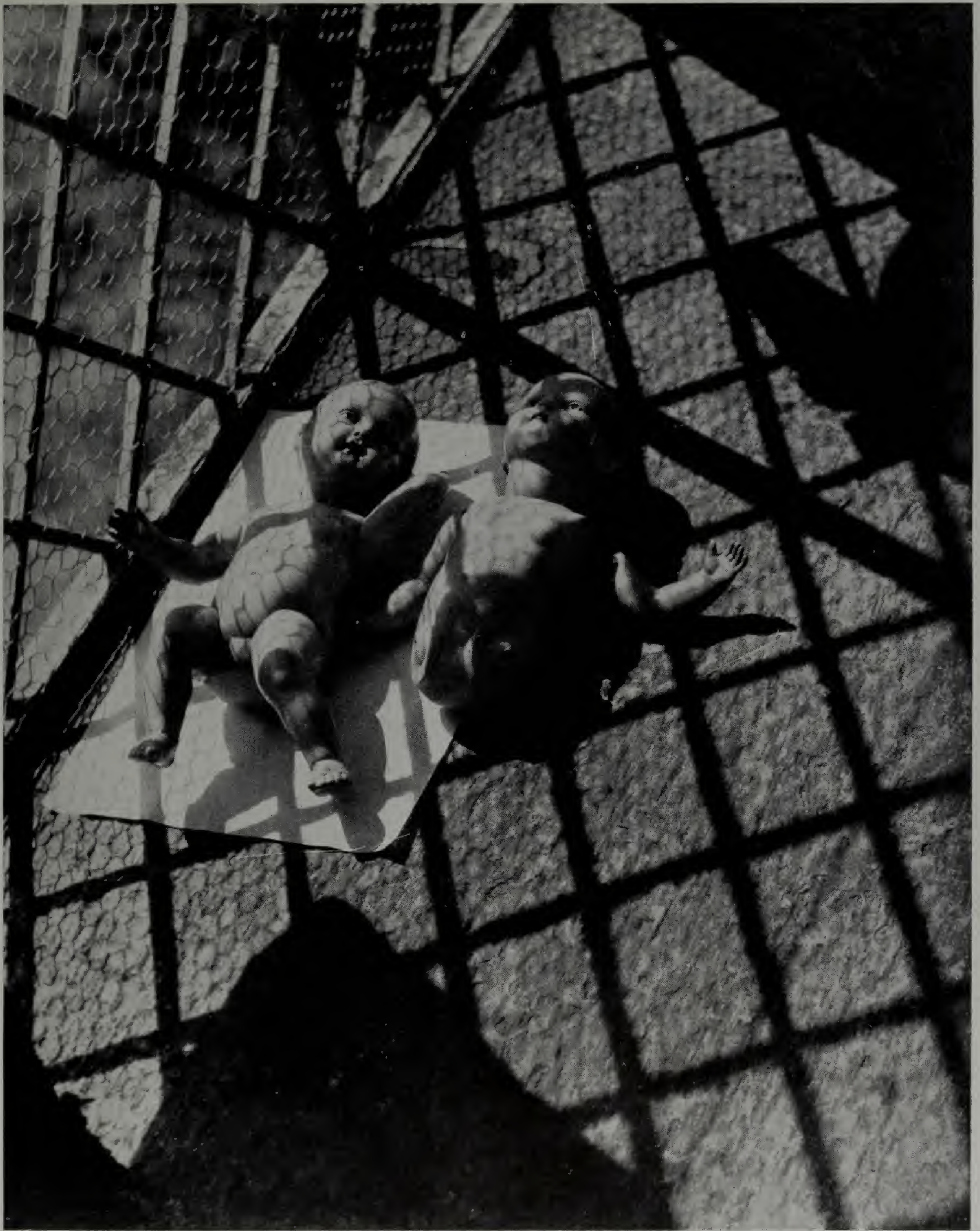


Fig. 231. ○ L. Moholy-Nagy, 1926

Fig. 230. ○ Milton Halbe, 1942
Portrait in the round



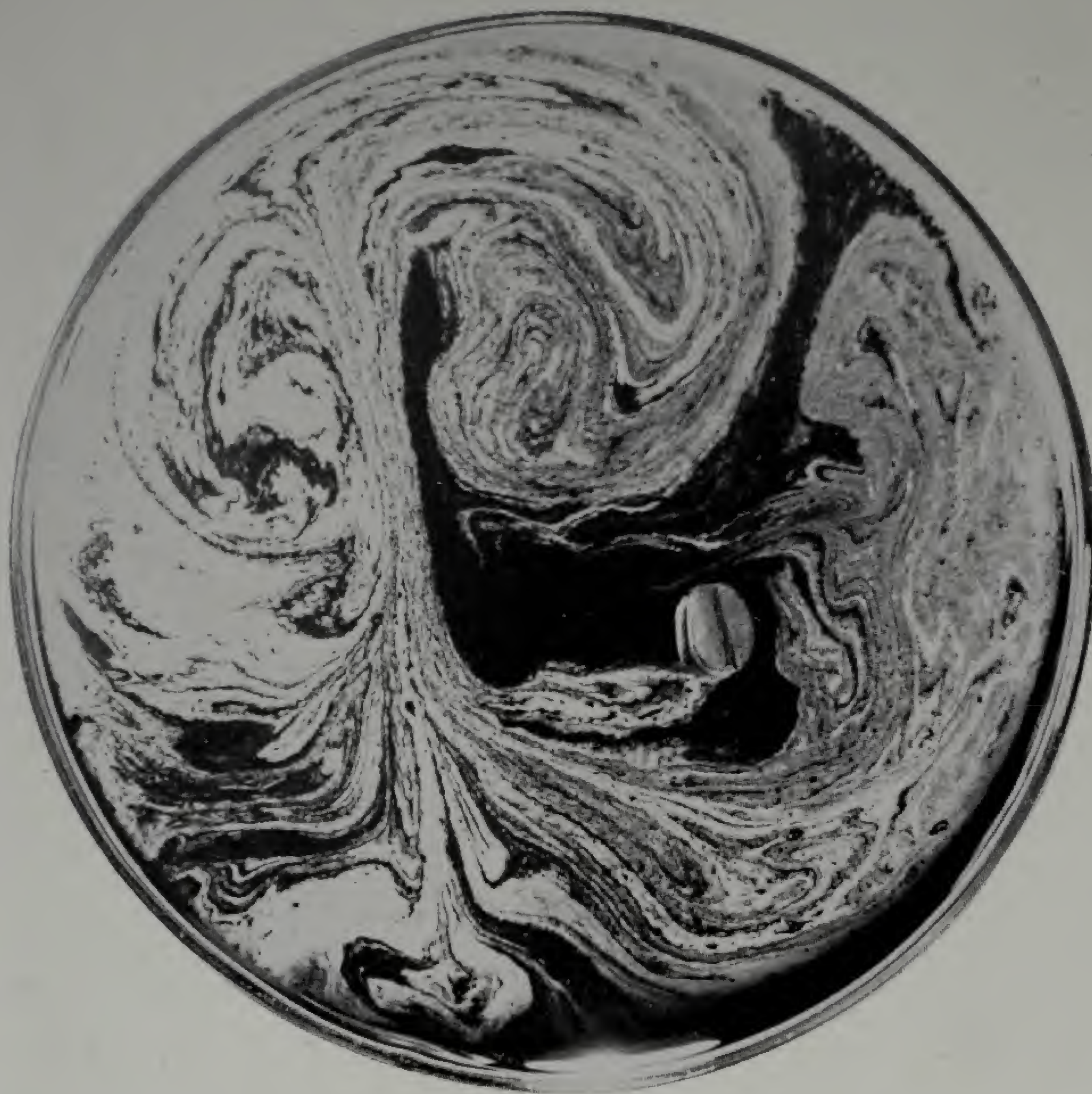


Fig. 232. Joseph Breitenbach, 1940

Photograph of fragrance of a coffee bean
 Patterns of fragrances are obtained by extending the very small amount of matter of which fragrance consists of as a very thin (monomolecular) layer. The thickness of this layer is $1/1,000,000$ mm, which means: if enlarged to the thickness of a sheet of paper, the thickness of the paper itself enlarged at the same degree would be higher than the Empire State building. The shapes develop in time and the forming of richer and richer abstract patterns may be observed and photographed. Generally the layman believes that every odor has its specific pattern, just as there is a name for every color. This is not at all the case. Very complicated phenomena caused by molecular structure, surface tension and electro-dynamical charges are involved. Besides, the odors we are used to looking upon as primary sensations of olfaction are highly complicated mixtures of a dozen and more odorant compounds

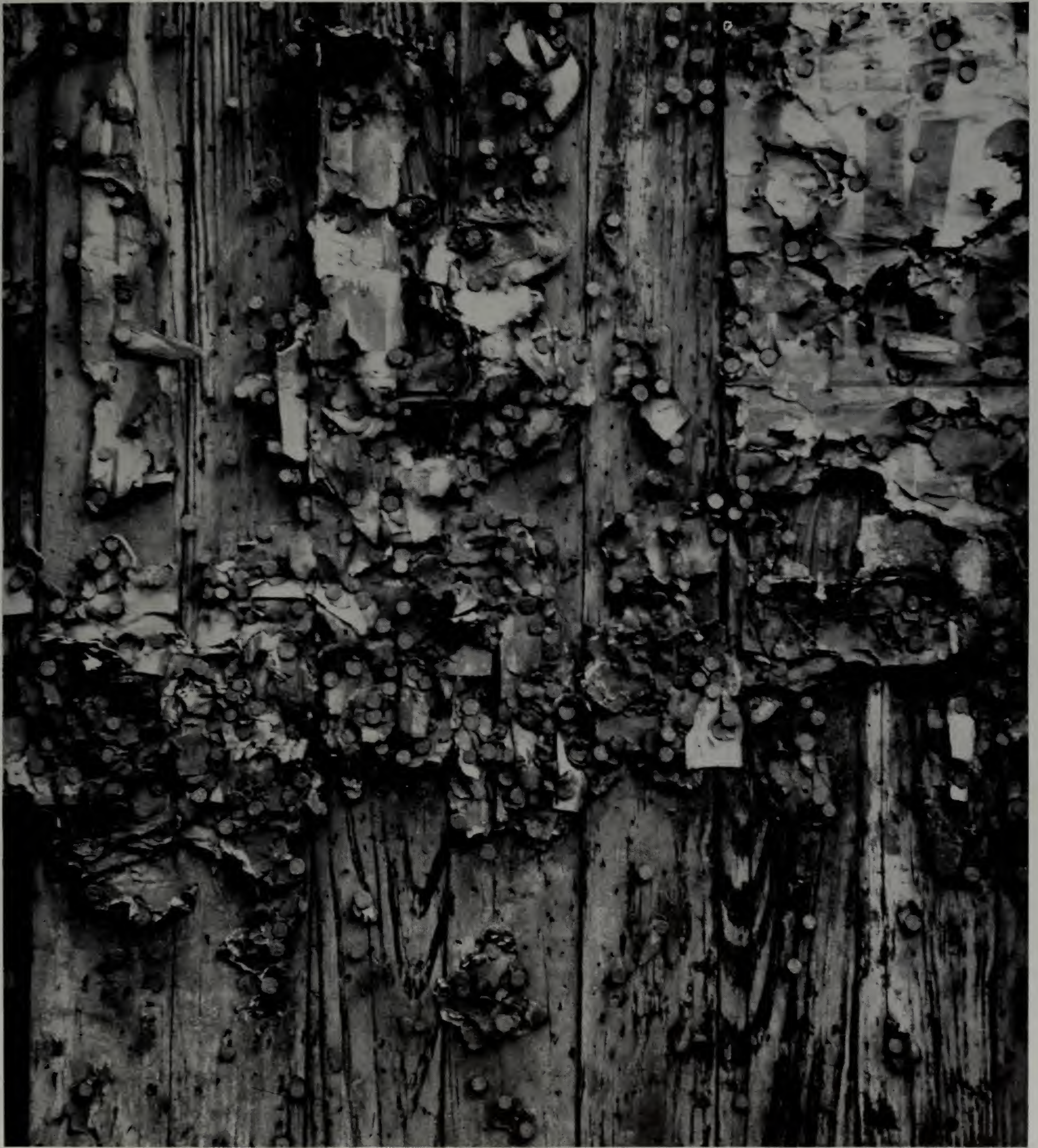


Fig. 233. ○ Frank Levstik, 1941
Billboard



Fig. 234. Alfred Stieglitz, 1907

"The Steerage"

Alfred Stieglitz is the great pioneer of contemporary photography. His work and his integrity are already a matter of history



Fig. 235. ○ L. Moholy-Nagy, 1927

where we must start in order to master the properties intrinsic to photography; where we begin to deal more with the direct sensory impact of photographic values than with the reproductive, illusionistic function of portrayal.

teaching photography

In teaching photography one may be tempted to start with the familiar, with still life, landscape or portrait. Yet portraiture, for example, presents unsuspected difficulties. It is a complicated task to observe the multiplicity of details, the psychological expression, the texture of the skin, the relationships of the dark and light and middle values, and the other aspects of the face revealing its most characteristic features. How can a beginner, who has never done any work in photography, hope to master this complexity at once? •

• *The stimulating results produced in the Photographic Workshop of the Institute are due to the inventiveness and research consciousness of its former and present staff-artists as well as technical experts—Gyorgy Kepes, J. J. Smith, Leonard Niederkorn, Nathan Lerner, Jim Brown, Frank Levstik, Edward Rinker, Eugene Bielawski, Eugene Idaka, Frank Sokolik, William Kech, Harry Callahan and Arthur Siegel.*

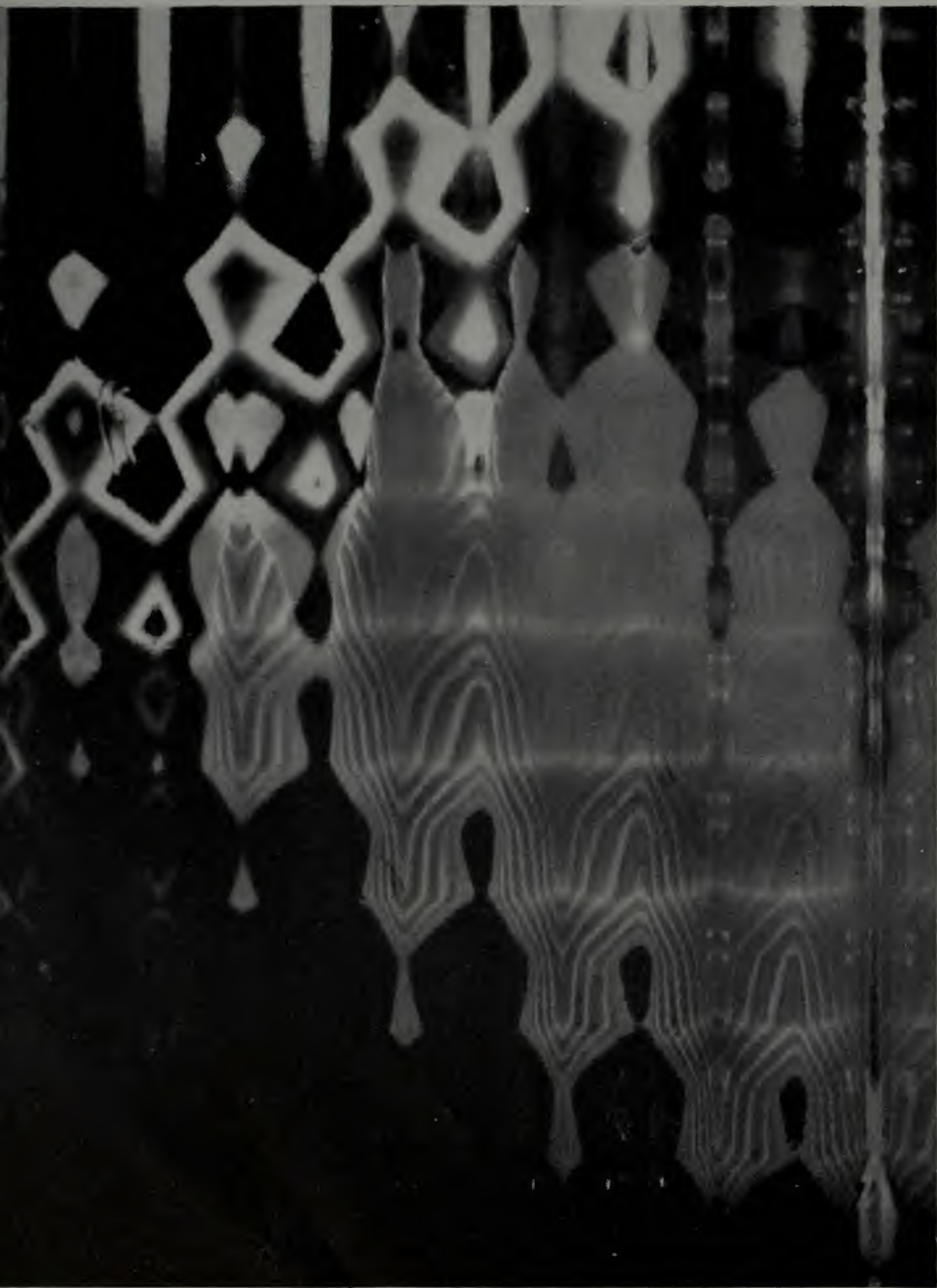


Fig. 236. Carlotta Corpron, 1944
Pattern of light in a glass brick

Fig. 237.

The silhouette—the great pastime of the 18th century—is the predecessor of the photogram (cameraless photography), which introduced an infinite variety of gray values into the one-tone shadow picture



Fig. 238. • L. Moholy-Nagy, 1937
Photogram

The problem is to find an approach to photography which breaks down the complex tasks into their fundamental elements, mastering them one by one yet pointing through each function to the wholeness of the solution.

photography without camera (photogram)

In order to learn about the properties of the light sensitive emulsion, which is the basic element of photography, it is best to start with the making of cameraless photographs. In 1835, Fox Talbot made the first crude photogram by laying lace on a paper treated with photo-sensitive emulsion. •

• Around 1920 Man Ray and I, independent of each other, re-invented the photogram. This technique has since become a standard means of visual expression.

Photopaper or film exposed to light will record the varied intensity of light sources in black and white and gray values. Practically, this is nothing more than a photo-negative, produced by laying objects on the emulsion-covered surface. Opaque objects contacting this surface block out all light leaving that part of the sheet unexposed, i.e., white. Shadows of these objects caused by lighting during the exposure result in varying gray-values depending upon the density of the shadows. Areas flooded with light, that is, fully exposed, become black.

The photogram exploits the unique characteristic of the photographic process—the ability to record with delicate fidelity a great range of tonal values. The almost endless range of gradations, subtlest differences in the gray values, belongs to the fundamental properties of photographic expression. The organized use of that gradation creates photographic quality. The photogram can be called the key to photography because every good photograph must possess the same fine gradations between the white and black extremes as the photogram.

The photogram conjures up as many interpretations as it has viewers and with new discoveries its original range can be greatly enlarged. For example, printed transparent cellophane sheets, blank films engraved, scratched glass plates covered with ink drawings, can be used as “negatives”. In an enlarging apparatus combined with the usual technique of the photogram these materials may give startling results. The photogram may also be used as a new method of recording light values when materials such as oil, paint or ink are squeezed between glass plates. This procedure flattens out the oil drops or the still wet, painted lines and fashions them into astonishing shapes which vary with the pressure applied.* These glass plates, used as negatives, produce photographic records of the mechanical pressure. By substituting photographic evidence for guesswork in computing the performance of materials, this method may become a contribution to technological application, similar to M. Hetenyi’s experiments with photo-elasticity developed for purely scientific reasons.** These may also be used one day as elements of creative expression.

The photogram understood as a diagrammatic record of the motion of light translated into black and white and gray values can lead to a grasp of new types of spatial relationships and spatial rendering. The receding and advancing values of

* I had an opportunity to use the oddity of oil drops squeezed between glass plates and a great number of other devices as “special effects” in the motion picture, “Things to Come”, by H. G. Wells, directed by A. Korda. (London Film, 1936)

** The method of three-dimensional photo-elasticity is based on the experimental fact that samples of phenolic resins, such as Bakelite, Marblette and Trolon, when annealed in a loaded condition show a complete preservation of

(a) the elastic deformation and

(b) the accompanying bi-refringence produced by the loading of the annealing temperature as it is described in the article, “The Fundamentals of Three-Dimensional Photo-Elasticity” by M. Hetenyi. (Research Laboratories, Westinghouse Electric Mfg. Co.)

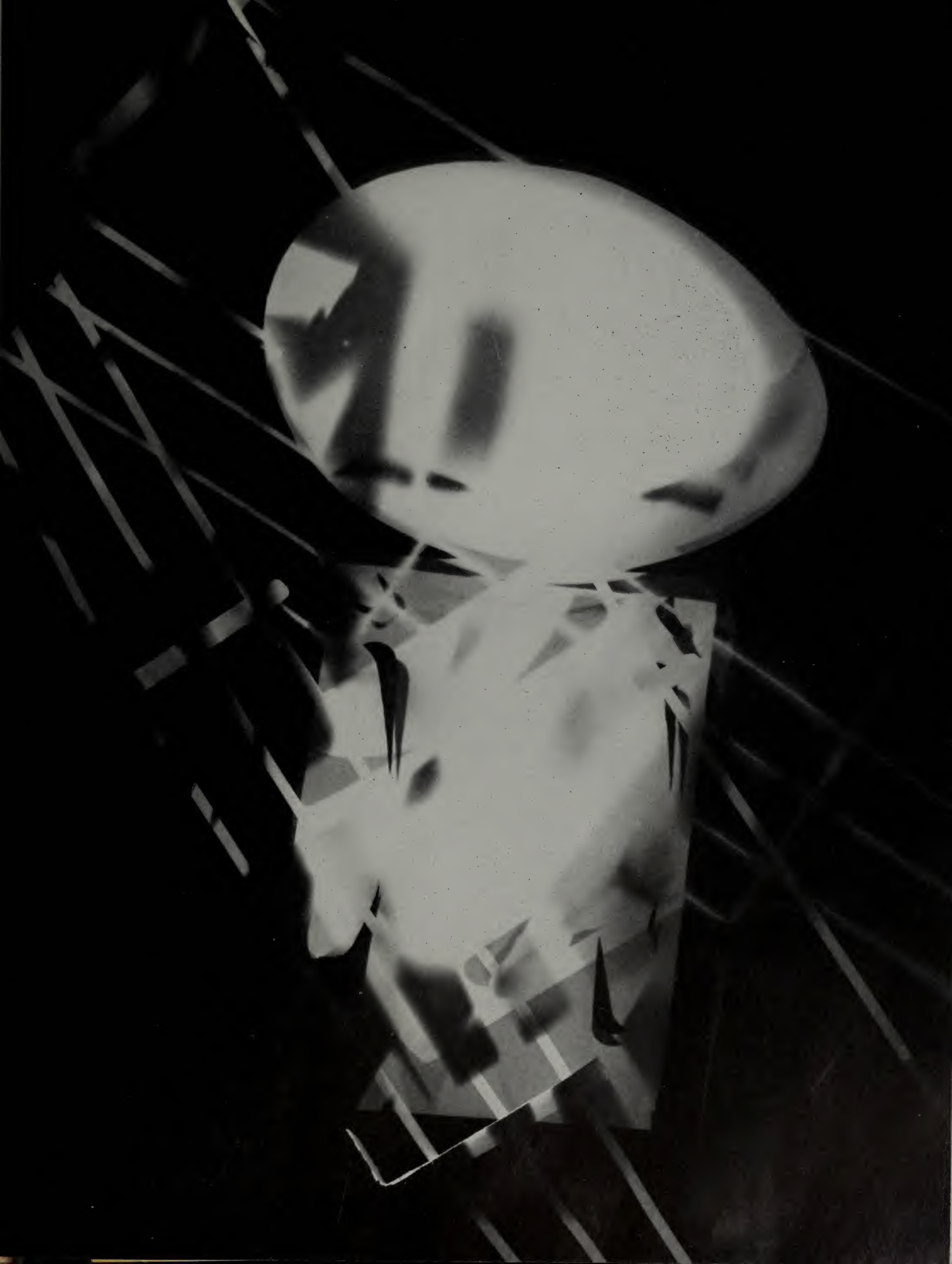
A similar method is used for checking the hardening of eye glasses used in industry for accident prevention. The appearance of a Maltese cross seen on such a glass behind polaroid makes possible an immediate decision as to its perfect execution. The cross indicates diagrammatically the equalized centered stress performance.

Fig. 240. ○ L. Moholy-Nagy, 1922
Photogram

Fig. 239. Dr. M. Hetényi, Westinghouse Laboratories, 1942

Photo elasticity stress—pattern of a fly-wheel model between two polaroid discs crossed and with a lamp behind them





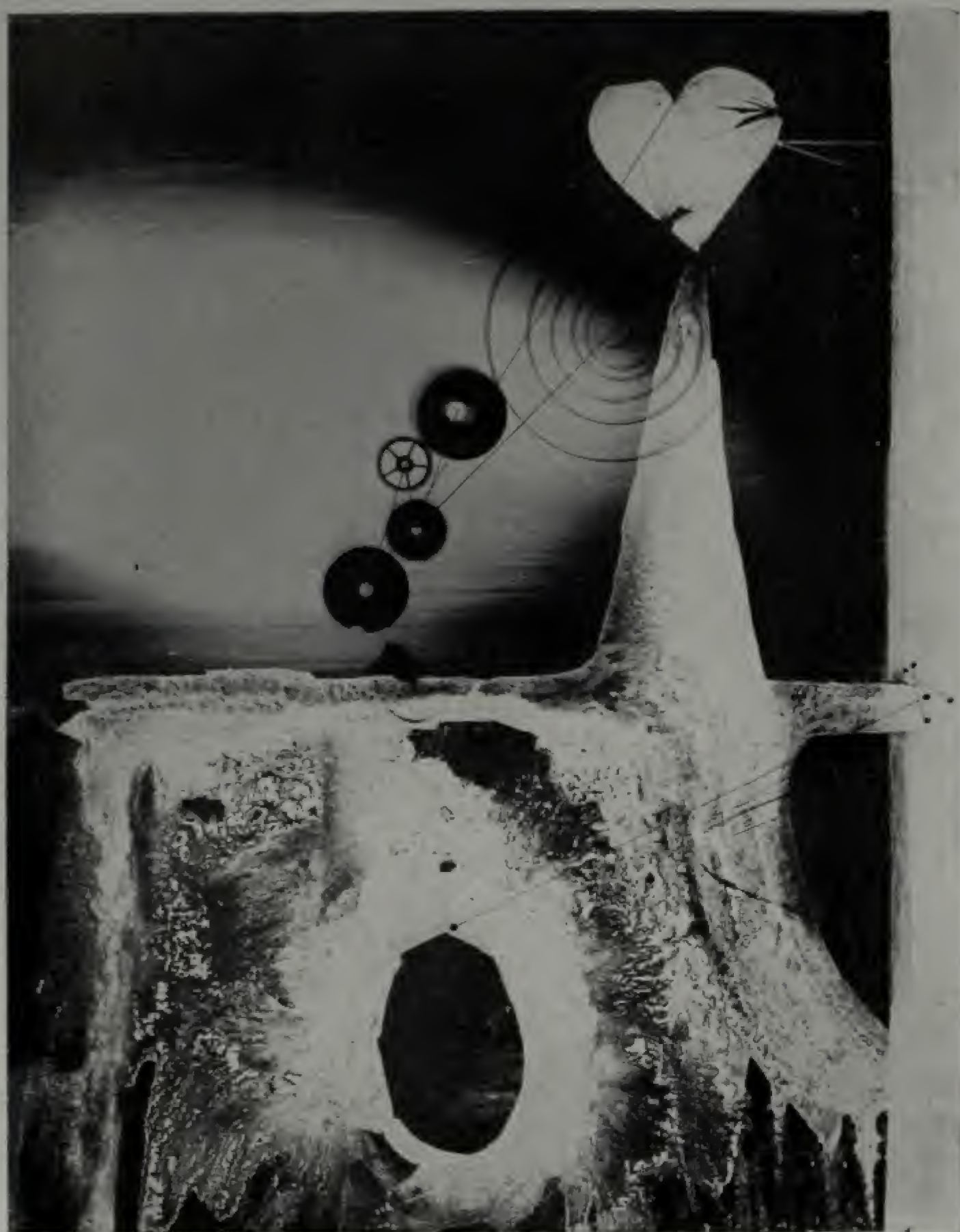


Fig. 241. ● Gyorgy Kepes, 1939
Experiment without the camera

the gradations, which are projections of the "light tracks", can be used for space—that is, space-time—articulation.

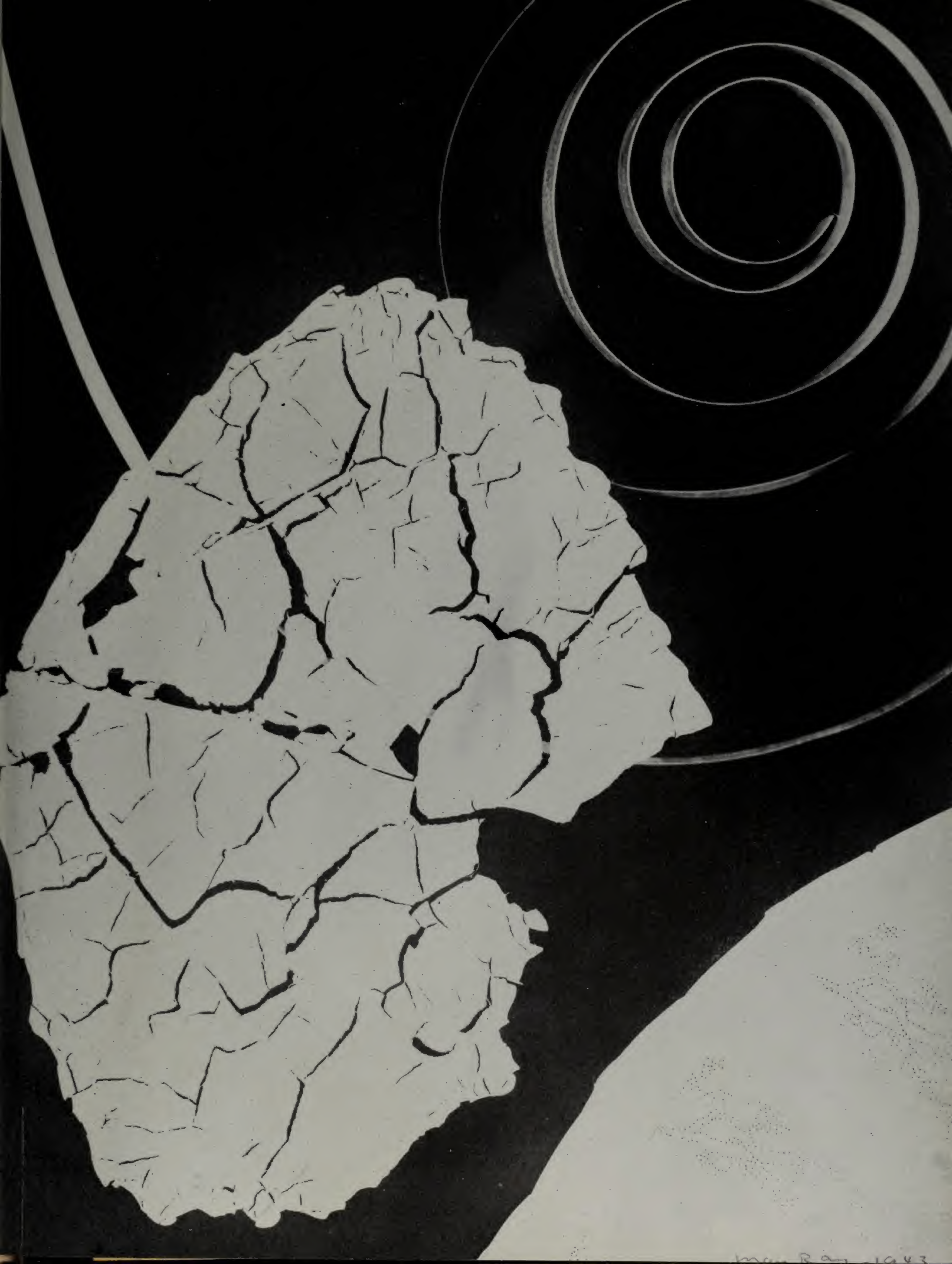
Architecture and the motion picture, both of which operate with light, should find new insight in that articulation.

●

This work need not only be for the sophisticated. Both the photographic amateur and the layman, acquiring through the photogram a deeper understanding of light and space values, will be inspired to explore the potentialities of the camera since the photogram teaches that the same characteristics of gradations and contrasts have to be applied to camera work too. Good photography with the camera must enable us to capture the patterned interplay of light and shadow exactly as in cameraless photography. Thus photography becomes the translation of a world saturated with light and color into black, white and gray gradations.

Fig. 242. Man Ray, 1943
Rayogram

Looking at the white surface full of black lines, one finds an astonishing configuration of lines, dozens of distorted faces and figures, in its pluralism a perfect counterpart of the Picasso etching (on page 250) May Ray calls his cameraless photographs, "rayograms"; Schade his photos without camera, "shadogram". When I started out in 1921 with my cameraless photographs I suggested the name "photogram" which has been adopted since by most people



May 1943



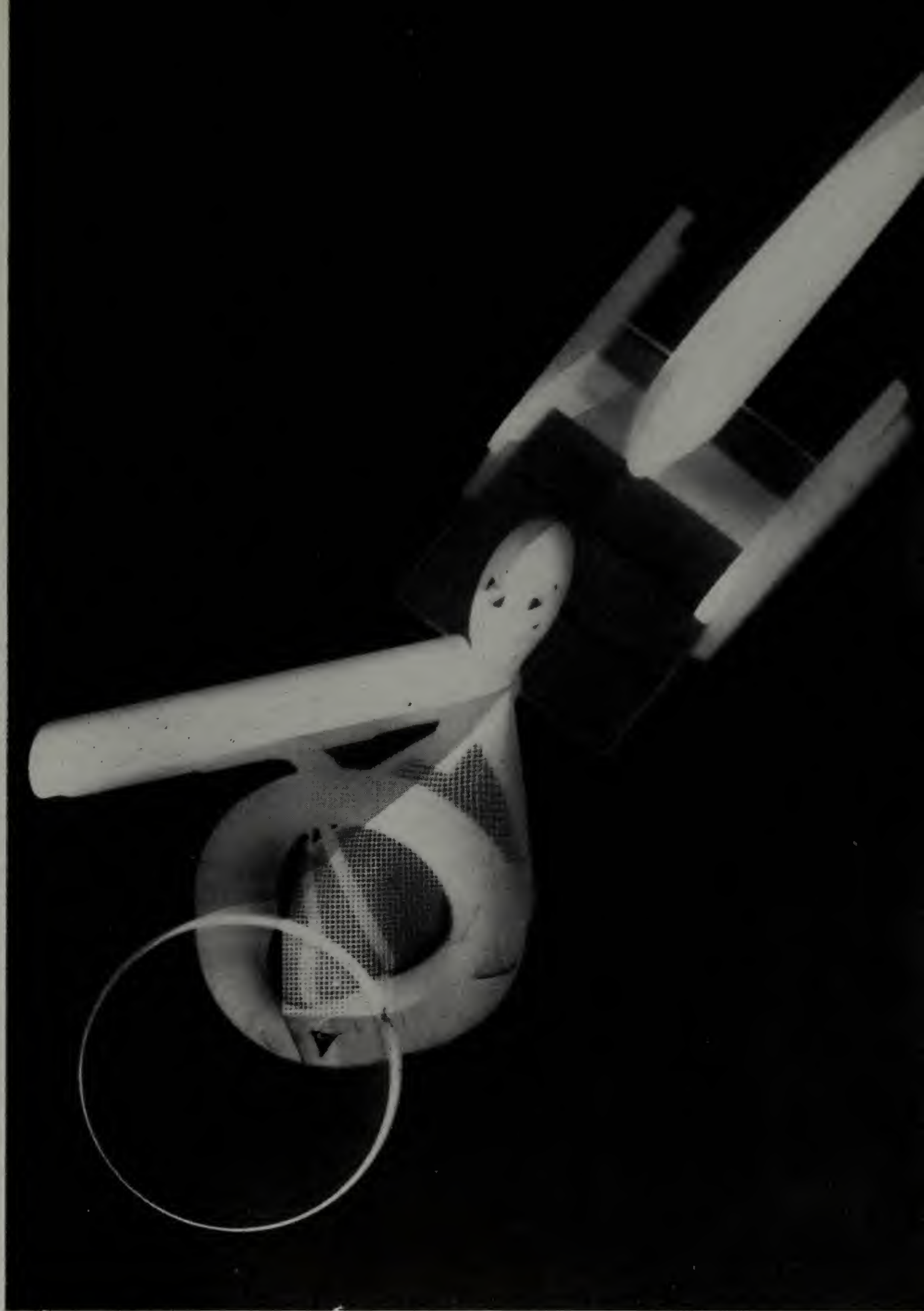


Fig. 244. ○ L. Moholy-Nagy, 1923
Photogram

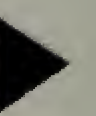


Fig. 243. ○ Gyorgy Kepes, 1941
Photogram



Fig. 245. ○ L. Moholy-Nagy, 1938
Photogram

Fig. 246. Lester Beall, 1944
Negative with white spots
This picture (from a medical advertisement)
shows a great similarity to the photogram





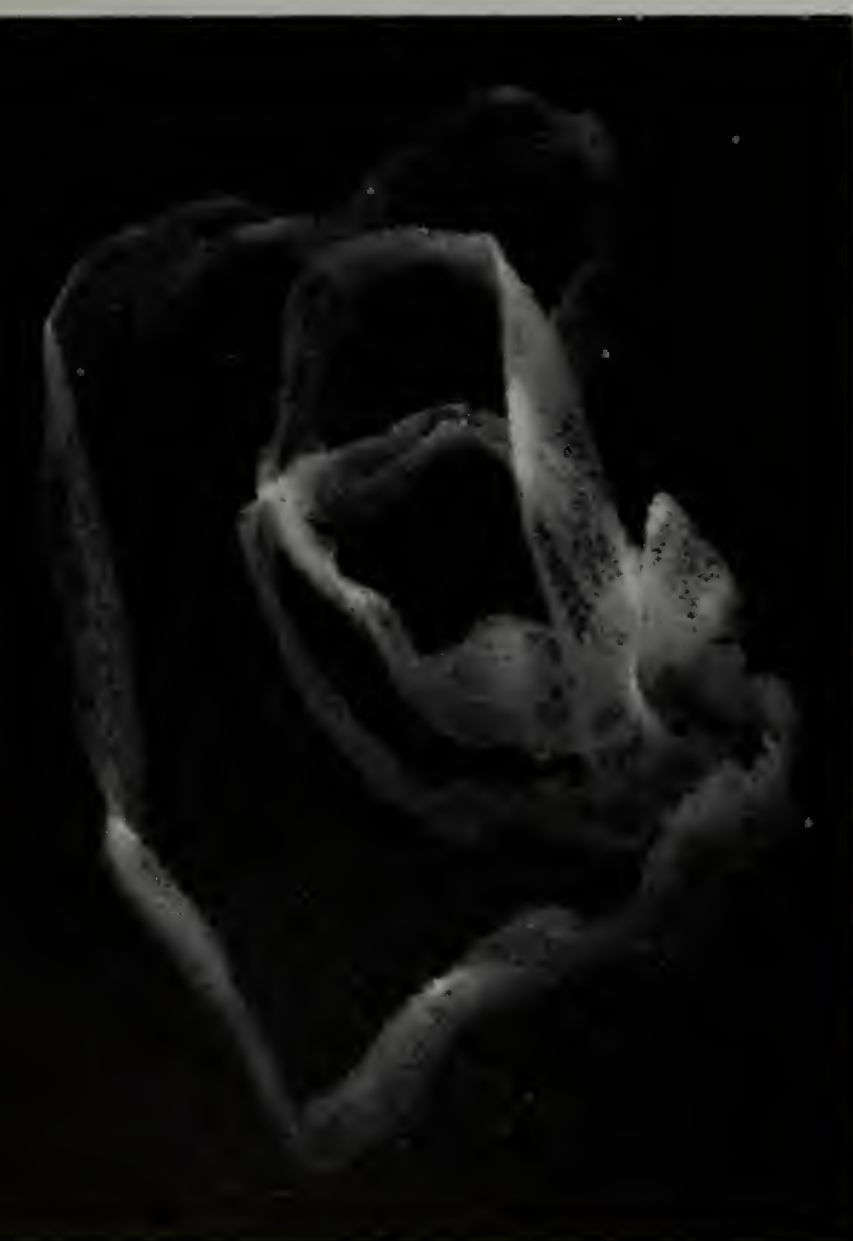
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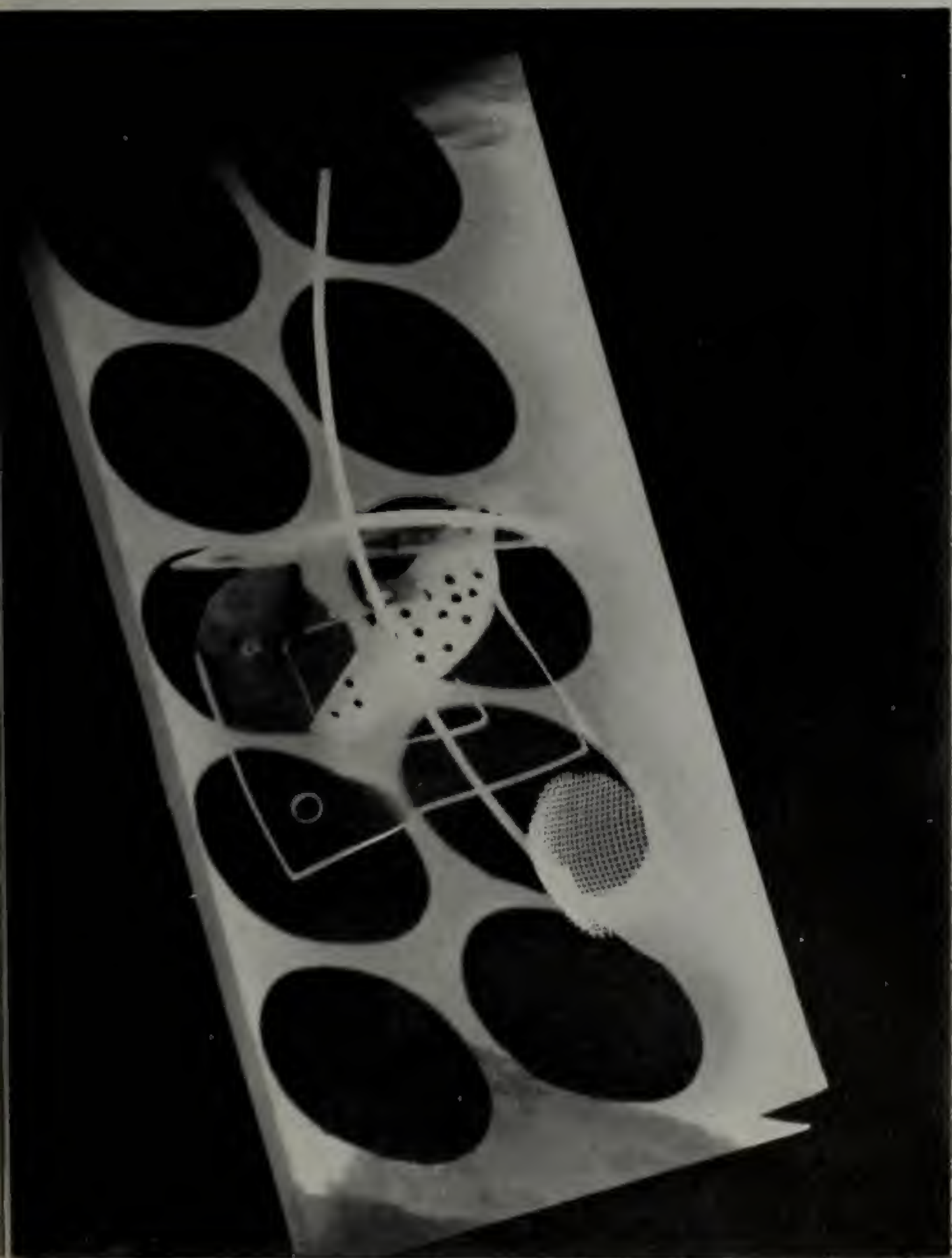
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8



The photogram which originates as a negative where black becomes white and white becomes black, reverses the habitual way of selecting photographic views for their black and white values. By this reversal of customary observation a new hidden world arises out of night scenes, settings in contrasts, glowing with sublime magnificence, a play of radiating light sources enveloping the objects with an aura and giving them fresh potentialities for lyric or dramatic quality.



Dictionary of the photogram

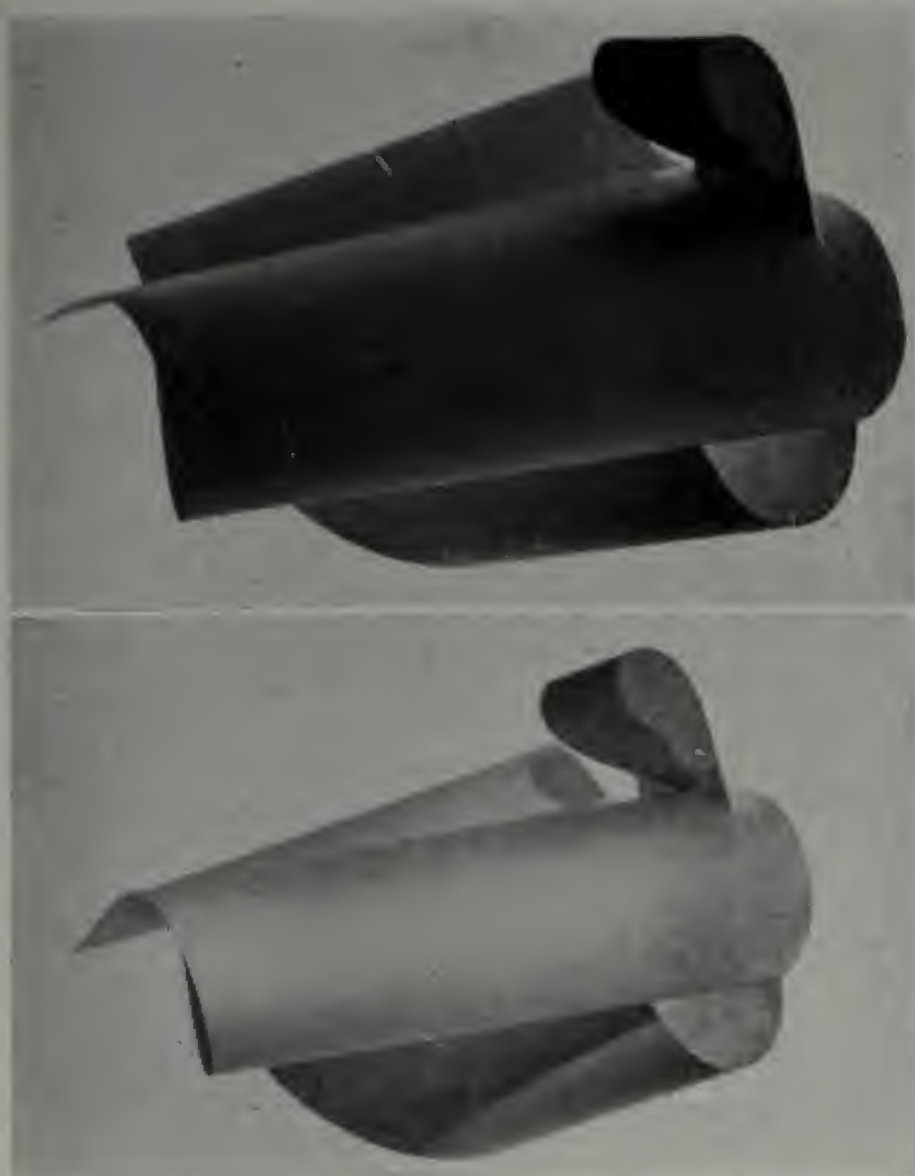
Figs. 247-254

(These examples have been selected by the author for a circulating exhibition on "Light as a Means of Expression", for the Museum of Modern Art in New York)

1. a pine cone laid on light sensitive paper and exposed to flashlight (M-N)
2. an egg beater (M-N)
3. coarsely woven ribbon (M-N)
4. tracing paper, pebbles, shells, string and paper (John Buffalo)
5. a drawing made by a pinpoint flashlight (M-N)
6. two hands on the photo paper in the developer exposed to light. The result is shown underneath as a
7. photogram (Robert Longini)
8. Perforated cardboard and metal, wire mesh, wire, transparent plastic (M-N)

These are some of the elements from which photograms, i.e. light composition with expressive intentions can be made

The enemy of photography is the convention, the fixed rules of the "how-to-do". The salvation of photography comes from the experiment. The experimenter has no preconceived idea about photography. He does not believe that photography is only as it is known today, the exact repetition and rendering of the customary vision. He does not think that the photographic mistakes should be avoided since they are usually "mistakes" only from the routine angle of the historic development. He dares to call "photography" all the results which can be achieved with photographic means with camera or without; all the reaction of the photo sensitive media to chemicals, to light, heat, cold, pressure, etc.



Figs. 255-256. ○ J. J. Smith, 1940

Light Modulator

Every piece of paper, crumpled or bent, acts as a light modulator. Here are shown two aspects, positive and negative, of the same piece of rolled paper. Every object can be understood also as a photo modulator whether skin, stone, metal—anything which reflects light.

Fig. 257. ○ William Keck, 1940
Feather



light modulator

A light modulator is the second step in learning the elements of photography.

The function of the light modulator is to catch, reflect and modulate light. A flat surface does not modulate, it only reflects light. But any object with combined concave-convex or wrinkled surfaces may be considered a light modulator since it reflects light with varied intensity depending upon its substance and the way its surfaces are turned toward the light source.

As the rays strike an object some are reflected, others absorbed, others pass through it (if it is transparent). If the substance is translucent, it mainly diffuses the rays.

A human face can be understood as a light modulator. A face contains few straight, flat surfaces. The surfaces are nearly all compound curvatures. Surface, texture and color of a face vary with the person's age, from the skin of a baby to that of an old man with countless degrees of differences between. Then there are the eyes, the beard, the moustache, the hair, the eyebrows and the eyelashes, the lips and the teeth, the rich variations in light and shadow of the ear—all present a problem in light modulation. With all its complexity, the face offers a most adequate study for the modulation of light. As has been noted, however, a portrait is rather a difficult photographic task for a beginner. It is more advisable that the beginner manufacture simple light modulators out of paper, metal sheets, plastics or other materials which can be scored, rolled, twisted, molded or cut to produce various modulating light surfaces. Every addition, every variation—another type of material, shiny, opaque, or transparent—will change the modulating qualities. The variety of modulators is endless. Each light modulator is the product of the individual's own ingenuity, dexterity and interest.



One of the photographer's tasks is to identify unmistakably for the spectator the true shape and nature of his object. This can be accomplished by lighting, from one or many angles, or with different combinations of light.

At the beginning of his studies, the light modulator represents for the student the "object." But the task always remains to use the light sources (or move the object or the camera if the light source is fixed) in such a way that the light defining the object immediately communicates the content. The wonder of communication lies in its endless variation. A creative photographer must try to enlarge the habitual scope of vision; create new relationships between known elements; utilize the expressive power of surprise growing out of the potentialities of the photographic means.

A good instrument for this is a "lightbox" made from a carton, two sides of which are perforated so that spotlights, some of them fitted with filters, can be placed at the holes. Objects can be hung on strings stretched within the box. The spotlights can then be arranged to strike the strings and objects in any manner desired. The light box is thus a particularly effective "laboratory" for the study of receding and advancing values of the lit surfaces. These effects produce direct emotional reactions



Fig. 258. O Millie Goldsholl, 1945
Light modulator

which can be enlarged upon through the combinations of visual fundamentals, shape, contour, texture, black and white and gray values and color. Thus, one may paint with light as surely as one can paint with oil and pigment.

Fig. 259. O G. Abbott, 1942
Light box exercise





Fig. 260. ○ Nathan Lerner, 1943

Nathan Lerner, who was the first to make a creative use of the light box and made with it the greatest number of experiments, comments on them as follows:

"Anyone working with light soon discovers that freedom of selection, a necessary factor in the creative activity, is limited unless there is some method of separating the accidental qualities of light from those qualities desired.

For light is more than simply a necessary adjunct to visual functioning, it is a possible medium of expression in itself, if one could only force its bounds and somehow make it reveal itself. Light possesses a tremendous psychological power because it is so deeply immersed in the farthestmost recesses of our unconsciousness, and because it is so intimately connected with our space experience

as to be almost identical with it. For visible space is lighted space and with light therefore we can evoke space experience.

I felt that if I could create a virtual world of darkness, which I could then develop into a disciplined world of light, I would be approaching the solution of the problem of controlled selection. The achievement was perhaps simpler than the wish would indicate.

I made a box, which was open on one side and with many holes cut into all sides. These holes were used for suspending objects and also served as openings for light to enter. Over these openings, objects (wire screen, etc.) could be placed and projected on the materials inside the box. When desired the front could be covered with glass so that smoke or gas could be introduced into

the box. This would enable one to study and photograph light in a purer form, as a beam, solid and beautiful, apart from its bondage to objects. The inside of the box was painted black.

With this simple device a great measure of control over light can be exercised. But aside from its value as a method for experimenting in a new medium, it has a further general value.

For light is one element; material object another, and the relationship of one to the other makes up our visual world. In the light box they become easily understood elements of visual communication. The light box, therefore, has significance for any artist. Working with it can give him a deeper insight into the visual-psychological elements that play an important role in making any picture exciting and meaningful."

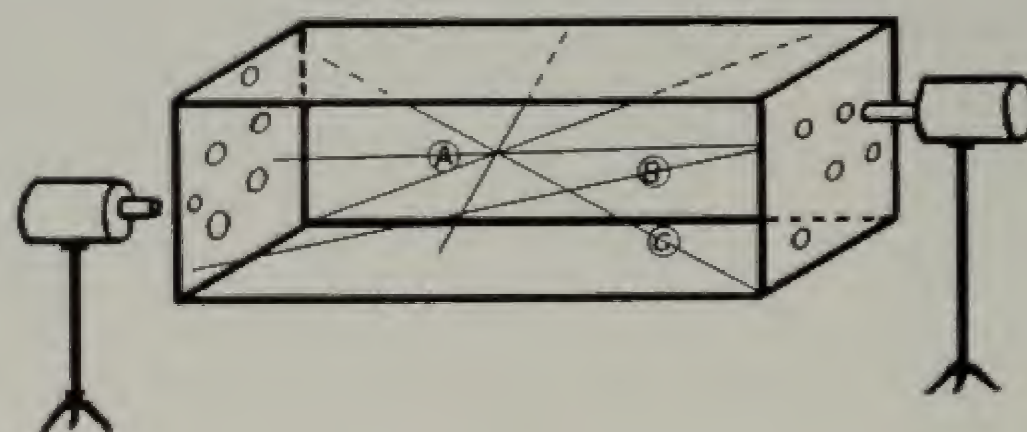


Fig. 260a. ○ Nathan Lerner, 1938

Diagram for a light box

The manipulation of light can be approached with a "light box", which is made from a cardboard box, the sides of which are perforated so that spotlights—if needed, fitted with filters—can be placed at the holes. Objects A, B, and C, can be hung on strings stretched within the box. The spotlights, touching only the strings and objects, create controlled lighted areas, situations which allow the study of the receding and advancing tone values

Fig. 261. O William Keck, 1939
Reflections and mirroring





Fig. 262. O Robert Buchbinder, 1939
Light modulator

Textures and structures can also be understood as light modulators; similarly macro and microscopic and relief photographs and solarization. After working with the light modulation in all its aspects the student will have no difficulty in photographing any portrait, landscape or industrial scene. Having studied synthetic light modulators in the abstract, separately, the student will know how each type of modulation will be transcribed on the photographic plate, film or paper. There will be many shapes and types of surfaces, space relationships, depth, height, comparative dimensions; interpenetrating surfaces that meet and cut one another; transparencies, mirrorings, etc. By controlling the uses and effects of each individually and in relation to one another in a photograph, he will be able to apply the principle of the light modulator as an element of a broad photographic concept.

●
In the interrelated training of the Institute the student's study of light modulators is integral to the rest of his work. He learns to see his own experiments better and more thoroughly; his sculpture, tactile chart, wire work, wood cut, etc., take on new meaning if he also understands them as light modulators. A single object shapes and unfolds itself in the student's own hands; each different experiment is another end which literally constitutes the object anew. He may experience also different revelations from his work if it is rendered differently. In this he has a great variety, as he not only photographs his own productions but at the same time makes freehand and mechanical drawings of them.

Dictionary of the light modulator

Figs. 263-269. O Jean Kendall, 1946

1. a sheet of white paper on a dark background
2. cutting a slit in the paper a number of grey tones occur
3. another cut is made
4. one corner bent, causing a gradual darkening as the paper curves away from the light source
5. the effects of bending up two sides
6. fastening four corners produces more complicated shadows
7. punching holes adds more values



Fig. 270. O L. Cuneo, 1937
Light modulator



Fig. 271. O Institute of Design, 1939
Light modulator (metal)
Light modulators in metal are most intriguing if placed on gray background on which the white reflections of shiny metal can be well distinguished

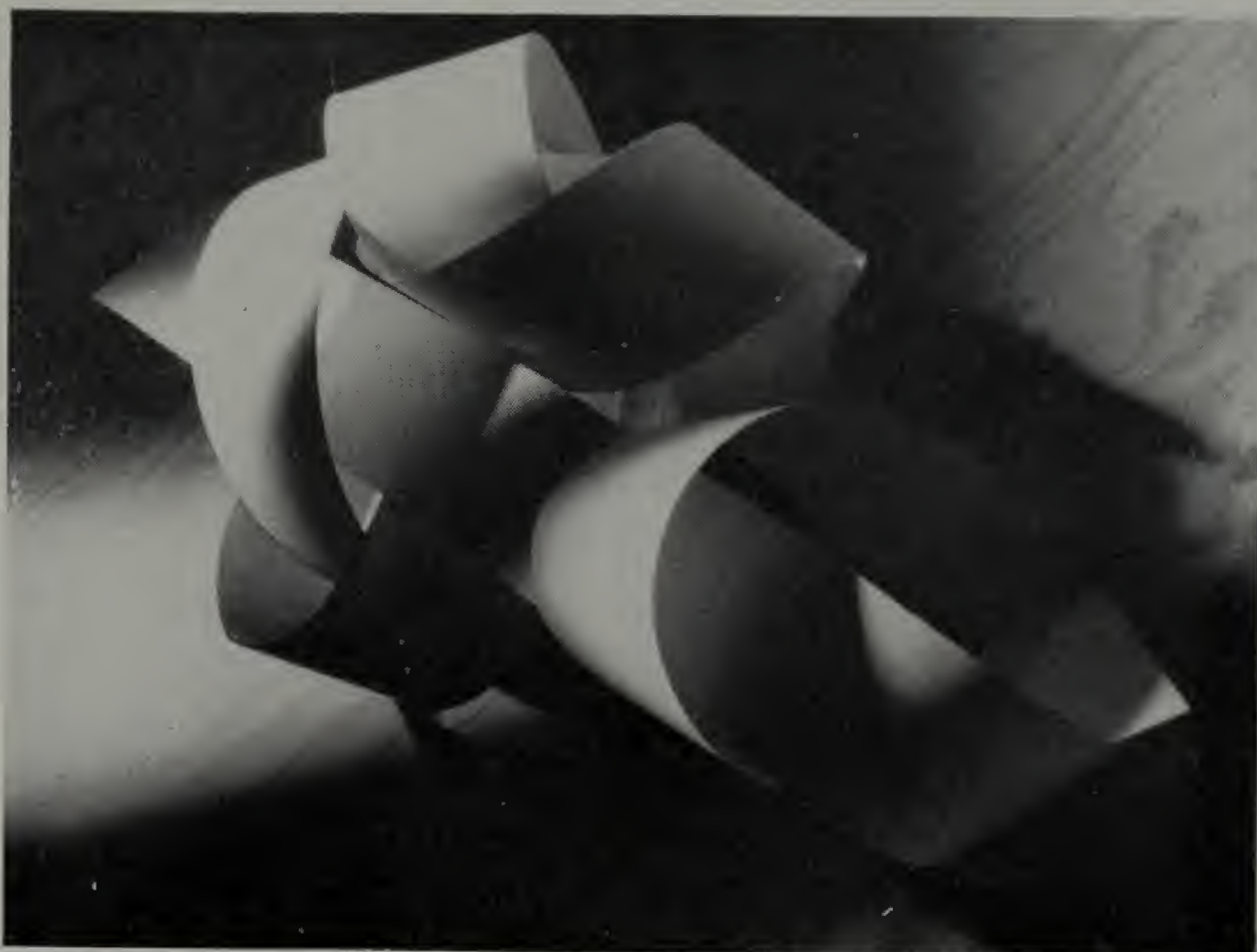


Fig. 272. O Margaret Roth, 1939
Paper modulator contrasted with a flat panel of grained wood





Fig. 273. O Nick Savage, 1943
Transparency on black



Fig. 274. O Robert Erikson, 1943
Reducing and magnifying



other experiments

Photographic experiments may embrace a wide territory: shadow observation of shapes on flat, curved or irregular surfaces, producing less or more emphasized distortions; observation of textures in the form of collages; mirror combinations; positive and negative images; partial enlargement and reduction of suitable subject matters; use of prisms for shifting details of objects, for example, an ear in the place of an eye.

Such experiments can be divided into three sections: light and objects; photographic optics; processing and its manifold combinations. These tasks clearly circumscribed at first can later develop into independent experiments. This is the prerogative of every research worker.



Fig. 275. O Institute of Design, 1941
Face in a multiple mirror

Fig. 276. O George Morris, Jr., 1943
Shifting with prisms
Can you see with your ear? or hear with your eye?

Figs. 277 a, b. Edward Rinker, 1944
Photograph and its distortion behind
corrugated glass.

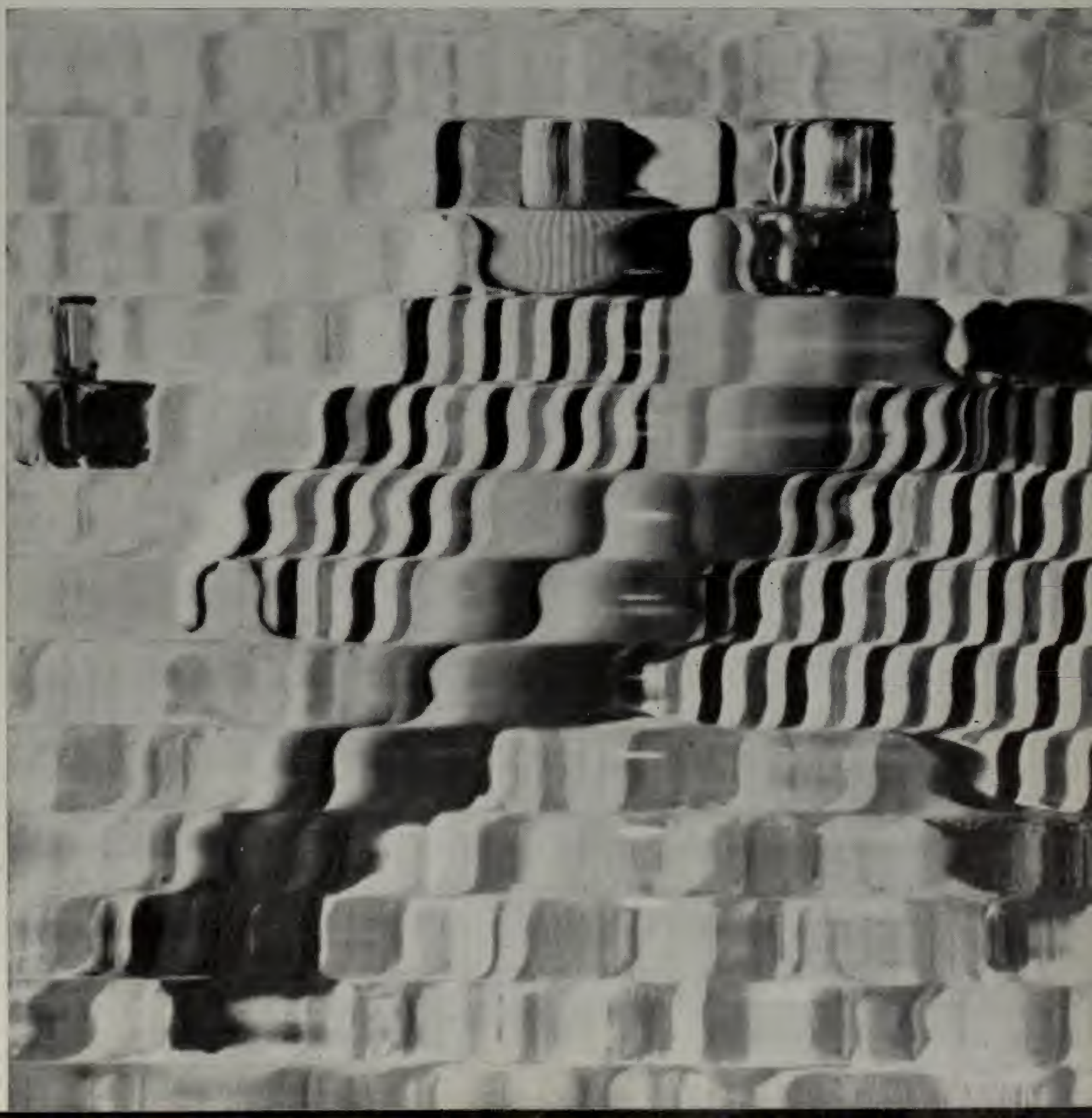




Fig. 278. Electron micrograph, 1940
One minute grain of face powder, enlarged 25,000 times under an RCA electron microscope
The electron microscope uses "particles" of electricity—electrons—instead of rays of light, and magnetic fields instead of glass lenses, to reveal the invisible. It attains direct magnifications of 10,000 to 30,000, with such fine detail that photographic enlargements to 100,000 and even 200,000 times life size are possible. This electron microscope is a good example of the fact that scientific findings may result in new technologies, which in turn may change life as did the lens microscope of Anthony Leeuwenhoek (1632-1723), by giving medical science a new direction

photographic vision

In rendering with the camera one may find visual sensations just as surprising as in the direct records of light evolved by photograms. Such particular developments are the bird, frog and fish-eye views, magnifications, ultra speed shots, reflections, penetrations, superimpositions, solarizations, distortions. Their systematic coordination opens up a new field of visual presentation, an extension of visual possibilities, in which we may expect much further progress. Photography can render, precisely register, the speed of objects or stop motion in a hundredth, thousandth, or millionth of a second. It can "see" through mist, even in the dark, by using infrared emulsion. It can penetrate and record the inside of opaque, solid objects with x-ray photography. In combination with the electron microscope, it can make visible fantastically minute matter. Such scientific and technological advances almost amount to a psychological transformation of our vision,* since the sharpness of the lens and its unerring accuracy

• *Helmholtz used to tell his pupils that if an optician were to succeed in making a human eye and brought it to him for his approval, he would be bound to say: "This is a clumsy piece of work."*

Fig. 279. ○ Frank Sokolik, 1945

Distortion

A camera was held in front of a corrugated glass plate behind which three persons were standing





Fig. 280. O George Morris, Jr., 1943
Solarization



Fig. 281. O Eugene Idaka, 1942
Solarization

These photos show the creative use of "mistakes" a photographer can make and include in his work: light striking negative and producing solarization. To this he could add: heat from the enlarging lamp burning the film; hot water reticulation; condensation frozen in refrigerator causing patterned shrinkage of emulsion; crystallization of hypo, fingerprints, etc.

have now trained our powers of observation to a higher standard of visual perception than ever before. Photography imparts a heightened and increased power of sight in terms of time and space. Even a plain matter-of-fact enumeration of specific photographic techniques enables the student to divine the power latent in these elements.

eight varieties of photographic vision

1. *Abstract seeing* by means of direct records produced by light; the photogram which captures the most delicate gradations of light values, both chiaroscuro and colored.
2. *Exact seeing* by means of camera records; reportage.
3. *Rapid seeing* by means of the fixation of movements in the instantaneous snapshot, stroboscopic photography, an instantaneous photograph with rhythmical interruption of the motion flow.
4. *Slow seeing* by means of fixation of movements spread over a period of time, prolonged time exposures; e.g., the luminous tracks made by the headlights of motorcars passing along a road at night; virtual volume.
5. *Intensified seeing* by means of
 - (a) macro and microphotography;
 - (b) filter photography which, by chemical variation of the sensitized surface, permits photographic potentialities to be augmented in various ways, ranging from the revelation of far-distant landscapes veiled in haze or fog to exposures in complete darkness—infrared photography;
 - (c) bird, frog and fish eye view.
6. *Penetrative seeing* by means of x-rays; radiography.



Fig. 282. O James Cross, 1943
Texture produced by dropping oil into the developer.



Fig. 283. O Institute of Design, 1941
Distortion in the ferrotype

Fig. 284. O Joseph A. Mills, 1942
Reflections
The ferrotype was lit by two spotlights, their reflections cast on the wall and photographed.

7. *Simultaneous seeing* by means of superimpositions; a process of automatic photomontage.
8. *Distorted seeing*—optical jokes that can be automatically produced by
 - (a) exposure through a lens fitted with prisms, of reflecting mirrors or the distograph
 - (b) mechanical and chemical manipulation of the negative during or after developing, using oil drops, suds, soaps, etc.; lighting, heating or freezing, resulting in distortion, reticulation, solarization, etc.

image sequences; series

There is no more surprising, yet, in its naturalness and organic sequence, simpler form than the photographic series. This is the logical culmination of photography—vision in motion. The series is no longer a “picture” and the canons of pictorial esthetics can only be applied to it *mutatis mutandis*. Here the single picture loses its separate identity and becomes a part of the assembly; it becomes a structural element of the related whole which is the thing itself. In this sequence of separate but inseparable parts, a photographic series—photographic comics, pamphlets, books—can be either a potent weapon or tender poetry.

But first must come the realization that the knowledge of photography is just as important as that of the alphabet.

The illiterate of the future will be the person ignorant of the use of the camera as well as of the pen.

photogenic versus photocreative

Photography—not only in series but also in single shots—can become the tool of the fantastic, of the dream and the super-real. The desire to penetrate the subconscious and set up a more governable mechanism of inspiration is an eternal human com-

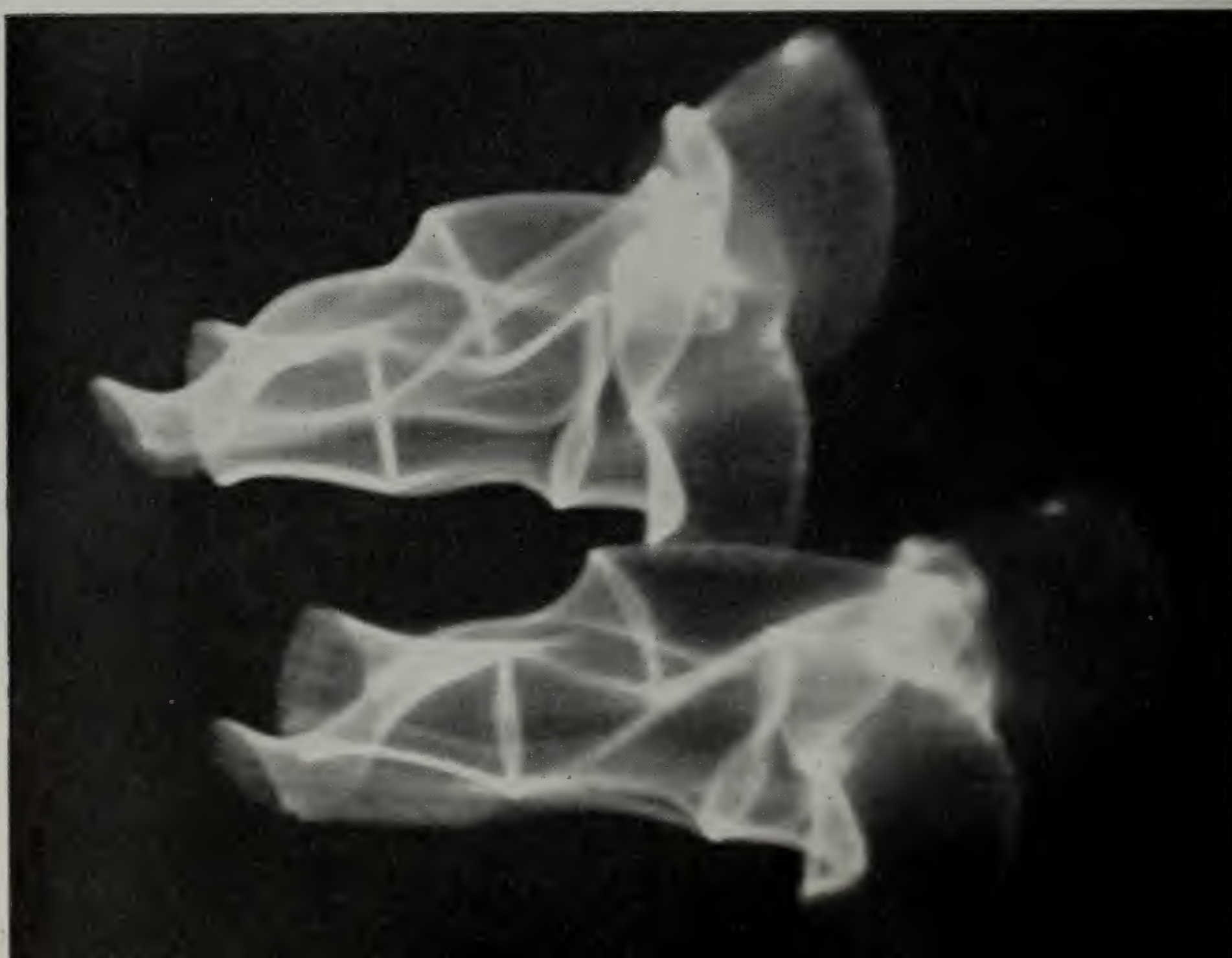




Fig. 285. O Stanley Kazdailis, 1944
Virtual Volume
A long exposure of a revolving wire structure

ponent. Cameraless photography, superimposition, prisms, photomontage, mechanical or chemical distortion, the use of negatives and solarization, are all basic to the technical means of photographic expression. And yet, properly used, they help to create a more complex and imaginary language of photography.

There are indications that with a changing of intellectual attitude the photographer of today is no longer exclusively interested in photogenic (the traditional illusionism plus glamor) renderings, but more in synthetically composed situations.[•] His attention is shifting to the control of photographic effects rather than on the event itself. He tries to acquire not only a photogenic but a photocreative mind. He will not only select what he finds but he will produce situations, introduce devices so far unused and neglected, which for him contain the necessary qualities of photographic expression. When he reaches a certain level of competence in the use of his tools the artist thus unhindered gropes toward new areas of expression within the realm of his medium.

[•] Objects, situations, persons are called "photogenic" if they have the properties for good photographic records. These properties can be of most diverse nature: roundness of shape; richness of texture; transparency; mirroring surface; skeleton structure;—everything which looks good in the photographic print.

A growing control over the means liberates his creative energies so that they can be concentrated directly on the problems to be expressed. The problems may be of conscious or subconscious nature. They may be determined by motivations behind which only emotional forces stand.

The inspiration to express these emotional forces may come from any layer of existence. The choice of medium is in the artist's hand; he must have the ability to summon artistic coherence out of the means he uses. In this way photography can be used for subconscious "recordings". This sounds paradoxical since photography was developed to serve exact observation and rendering of the immediate reality—the ideal tool of an age devoted to science and reason.

In the 19th century telescopic and microscopic "miracles", x-ray and infrared penetrations were substituted for fantasy and emotional longing. These phenomena, motion and speed, electricity and wireless, seemed to give food enough to the imagination without introducing subconscious automatism. Photography was the golden key opening the door to the wonders of the external universe to everyone. The astonishing records of this period were *objective* representations, though they went in some cases beyond the observation capacity of our eyes as in the high speed, micro-macro, x-ray, infrared and similar types of photography. This was the period of "realism" in photography.

new directions

The new arts opposed the "flattening" simplicity of a reality based upon logical derivation alone, without the acknowledgment of the realm of the psychological space-time. The expressive character of dreams, the automatic writing employed by surrealist authors, with direct impact of words—slang, misspellings and re coined idiomatic expressions—offered an analogy for a new use of the visual means.*

Painters and photographers tried to enlarge the expressive content of their work by fusing the customary with the unexpected and turning what the avant-garde termed the "law of chance"—fortuitous findings—into meaningful results.

superimposition

The mechanical process of double exposure or printing photos over each other was one of the means used to generate imagination and emotional concentration. Superimpositions in simple as well as sophisticated manifestations can "record" dreams or dream-like content. Such superimpositions overcome space and time fixations and unite strange and diverging subjects into new entities. They transpose insignificant singularities into meaningful complexities; banalities into vivid illumination. The transparent quality of the superimpositions often suggest transparency of content as well, revealing unnoticed structural qualities in the object.

* Automatic writing was originally a psychological experiment. It was produced in a kind of self-hypnosis, writing down thoughts occurring without conscious control. It is a variation of the "stream of consciousness" technique in literature.

Fig. 286. ○ Arthur Siegel, 1946
Superimposition of two negatives





Fig. 287. Raoul Hausmann, 1920
Tatlin at home (photomontage)
Hausmann, the dadaist, was with John Hartfield, Hannah Hoech and George Grosz, one of the first of the "photo monteurs". The photomontage, an assemblage of single photographic illustrations into a new unity, was derived from the "collage" of the cubists. The collage itself was long known at the end of the 18th century as a kind of greeting card and it had a revival in the 1850's

photomontage

Another way of extending the means of photography is offered by the photomontage.

Around 1920 the dadaists, the predecessors of the surrealists, made the first photomontage.* Their mosaics made up of magazine clippings, measuring tapes, catalog illustrations, etc., showed clearly the single elements crudely glued together as were the cubist collages. The dadaists in exhibiting the brutally torn and roughly-cut photographs, showed that they held in contempt historic "beauty" with its illusionistic connotations. Theirs was a "counter war", an emotional pandemonium full of fury and ridicule directed against the imperialism of the first world war and the social shortcomings of their epoch. These photomontages were reminiscent of the first futuristic, *bruitistic* symphonies which combined noise and hubbub into a thundering orchestration. • •

The photomontage later arrived at a more "rationally" organized form somewhat easier to grasp, though still with the interpenetration and fusion of bizarre relationships showing the vicious, funny and witty, the earnest and tragic side of the creature; often the plot against pettiness and inadequacy.

Photomontage—like superimposition—also attempts to develop a technique for the recordings of events occurring on the threshold between dream and consciousness; a tumultuous collision of whimsical detail from which hidden meanings flash; visual poetry with bitter jests and sometimes with blasphemy.

Most photomontages demand a concentrated gymnastic of the eye and brain to speed up the visual digestion and increase the range of associative relationships.

• *Photomontage was known to old photographers who sometimes had to "patch-in" individual photographs into group pictures when circumstances did not allow the shot of the whole group.*

• • *Around 1912 the futurists tried to rejuvenate music. Luigi Russolo composed a futuristic symphony containing only noises ("bruits") produced by electrically-powered noise mechanisms. (See also page 292.)*

Fig. 288. O Robert Sanmayers, 1944

Photomontage

In the Institute of Design, Chicago, many experiments are made which can be adapted for immediate practical use. This is such an experiment, a combination of a drawing and a photograph. This may have its significance in newspaper illustration and advertising, in printing on absorbent paper which doesn't allow the use of fine halftone cuts



Fig. 289. O L. Moholy-Nagy, 1925

The structure of the world (photomontage)

The photomontage can be dramatic, lyrical; it can be naturalistic, abstract, etc. Here is a satirical montage making fun of the fright of the monkey and the quack-clacking super-geese (pelicans) who discovered the simplicity of the world constructed as a leg show





Fig. 290. Xanti Schawinski, 1943
Variation on a theme: the face of Walter Gropius

"I wish you further growth. I hope the roots of your work go deeply into the ground of America." Xanti Schawinski says this with his photomontage to Gropius.

The face on the top appearing in relief is the result of printing a negative and a positive over each other, slightly off register



Fig. 291. ○ L. Moholy-Nagy, 1943
"Zeus has his troubles too"
Photomontage on a photogram background

sculpture

the general situation•

While many people succeed in establishing some sort of relationship between photography and painting, especially if these contain subject matter, sculptural creation stands in a peculiar isolation. People generally cannot enter into the experience of sculpture, its plastic relationships, biological and social implications. One of the reasons may be that sculpture usually tells a very meager "story".

aspects of representation

To *primitive* man, representation of a person, animal or an object, meant magic. By making plastic images, which moved and overpowered him, he brought them within the realm of touch, putting them at his service.

Another aspect of his life was the incomprehensible fact of death. By mummification or other preparations he changed the decaying corpse into tangible reality so that the dead ancestor, the root of the family, remained in the family possession as a powerful protector. A later stage, the death mask, may have sublimated this process. This became the origin of the portrait. The desire to materialize natural forces and to secure their permanent presence was extended also to apparitions who lived only in the world of imagination. Through the ages man longed to be in contact with ancestors, gods, the personified powers of a rich pantheism. Captured within a definite form, they became—even if, and perhaps because, prayed to as deities—his servants.

Clay, wood, stone come to life in the artist's hands. He perceives the existence of the typical, and what is common in different phenomena. Then one day slight deviations from the typical are observed. To the original observation of the typical features are added the individual characteristics. The slightest twitching of the

• The present chapter on "sculpture" is a revised version of the chapter on "volume" from "the new vision" and contains examples of the student work from the modeling and sculpture classes of Alexander Archipenko, Robert J. Wolff, Johannes Molzahn, Calvin Albert and Emerson Woelffer.

muscles of face and body is given their values in expression. The whole representation is brought down to infinitely fine gradations. The way leads from the typical to the individual. And when no further progress in this direction is possible, the rebound occurs; instead of tangible realism a neutralizing calmness takes place, a stylization, a striving for indifference toward the psychological aspects. This leads to a more conscious emphasis of the expressive and meaningful effects of material, shape, volume and their relationships. There is the great discovery: a "three-dimensional" language developed for expression.

In the transitional period from realistic to abstract sculpture, common still life objects from the Parisian cafe were represented; bottle, absinth glass, violin containing the concave-convex, curved and angular, solid and perforated, horizontal and vertical, smooth and rough plastic elements. Later the objects wholly disappeared and the expressive impact was produced by the relationships of the pure sculptural elements to each other and in their relation to light. Not the representation of a person, animal or object was the problem any more, but the paramount organization of spatial references. Through the biological organization of his senses everyone can have a direct, unadulterated reaction to these elements. This is the basis of the new esthetics of the constructive nonobjective sculpture—the articulation of volume.

fundamental attitudes in treating materials

We made pertinent studies in the psychophysical evaluation of color but we know almost nothing concerning volume, shape and space. Therefore any attempt to describe sculptural works in objective terms may benefit future research.

Sculpture can be approached from different viewpoints: tool, material, form, volume, size, proportion, balance, positive-negative, setting, expression, light, etc. But the beginning of appreciation comes from the way the sculpture is made, from its technological quality. The technique of making serves to express the structure, the form. The form is the result of many components: will, tools, reaction of the material synthesized in the process of making. This in turn changes over into a quality of expression.

If several people are handed identical blocks of material to be worked on, certain fundamental tendencies can be observed. At first the worker respects the homogeneity of the block. He examines it, feels it all over, estimates its weight, its dimensions. Then he starts, according to his temperament, in the more passive mood of a conserver or in the active mood of an experimenter, to work on the block with a tool. His purpose may be quite clear. He may know what he would like to create, but as he proceeds he may see that his tool and his material allow him only a limited realization. He has to adapt himself to these requirements. Slowly he becomes better acquainted with his materials and tools. He invents new methods and implements with which to approach his medium. Sooner or later he dares to proceed more drastically. He discovers the play of light caused by his indentations



Fig. 292. Henry Moore, 1936
Marble sculpture



Fig. 293. George L. K. Morris, 1938
Project for a monument (concrete)

in the material. He tries to penetrate deeper into the block. He carves a hole into it producing a "hollow, void space", a *negative volume*. He notices the relations between full and empty, between round and angular, dull and sharp, small and large, raised and recessed. Such an articulation of the material is the basis of sculpture.

volume creation

As man faces his material and experiences it, he finds out that sculpture is the best form, the original form, for taking possession of volume. Compared with volume, everything else—technical handling, weight, structure, representational idea, likeness, expression, proportion, rhythm, consistency, color, texture—is secondary, belonging to the sphere of mastery of details. These details are not primary to the essential grasp of volume, and thus, to the intrinsic law of sculptural expression.

The most intensive method of experiencing volume is the material grasp and articulation of the three-dimensional body which is a clearly circumscribed mass. But this sensory, emotional approach has been in the course of cultural history more and more superseded by an intellectual conception of likeness to known objects. Thought content and illustration overrode form; description supplanted grasp.

There is, for instance, the organic "beauty" of a face—a light modulator as well as plastic shape. Its elements are easy to discriminate, the subtle convexity of the forehead which continues in the even hollows of the eyes, the projecting nose with fine articulation of its sides, the graceful, symmetrical curve of the mouth. Underneath again the convexities and concavities; the muscles and bones are sheathed in tense skin. Alas, almost no one can appreciate today these rich modulations of a face because most people are accustomed to attach a subjective meaning to the term "beauty"—that is, the Hollywood standard. To rediscover a face, a head in its superb sculptural quality, one must almost see it in reverse, as the inside of a mask.

The fine modulations of a frontally-turned face are only one part of this sculptural quality. The experiences broaden when the head turns slightly to a three-quarter profile. Then in younger faces, a tender contour is shown from the temple to the chin. The protrusion of shapes which appeared rather flat when observed in front, now offers a wealth of compound curvatures. The profile again is a singular experience of an organic shape which unpredictably changes at every move.

Through centuries faces were looked at as a depository of literary interest, and portrait-conscious painting and sculpture evaluated them only for personal likeness. The significance of the plastic features of a face, of shells, flowers and a thousand other matters has to be rediscovered again, stripped of literary meaning. The abstract painters and sculptors who are experimenting with various plastic shapes recapture for the unliterary eye their vital emotional power in an affirmative way.

As in photography where the light modulator can be used as the point of departure for the discovery of the genuinely photographic elements, so *plastic modulators* can lead to the grasp of sculpture. The start is simple: a flat sheet of paper twisted; a

plain surface warped in large waves; a lump of clay wrung in a rag; a rod coiled to a spiral. These are a few elements from which the plastic quality of the new sculpture can emerge independent of imitation and story telling.

the five stages of volume modulation (articulation)

In working with the material and in discovering the volume relationships as they become clearer, we may set down various stages of the plastic modulator. They give not only the genesis of the grasp of sculpture by the individual but they also indicate the development of sculpture in general throughout the history of all civilizations.

The five stages of the plastic "modulator" are:

1. *blocked-out*
2. *modeled (hollowed-out)*
3. *perforated (bored-through)*
4. *equipoised (suspended)*
5. *kinetic (moving).*

These explanations refer in general to sculpture-in-the-round which finds its justification, like easel painting, without architectural relationships. The legible meaning of this development may be summarized also as the freeing of the material from its weight; a development from mass to motion.

parallel phenomena

One can find close parallels to this development in nature. For example, water at rest, in motion, in solid, liquid, and gaseous forms exhibits similar tendencies. Water exists as a tiny drop or as a smooth surface stretching out far and wide; it may appear as a placid or rushing brook, as raging sea, as pattering rainfall, spraying fountain or a drifting cloud of steam. It may be frozen, as in a snow crystal, ice or crystalline flower on a window pane. These manifold changes arise from the extraordinary variety and adaptability of the "medium" to different shapes. Man has often been moved to employ water for artistic ends. In earlier periods—in both the East and West—water, so responsive to adaptations, was exploited according to an almost ethereal extension; from the calm lakes of English parks to gushing Latin fountains and foaming cascades. All such efforts were directed toward displaying water under as many aspects as possible and to dematerialize its bulk.

A similar quest for subduing or lightening material is made in many different forms of human expression: in sculpture, from mass to motion; in painting, from colored pigment to light; in architecture, from restricted and closed to free, open space. The common denominator may not always be apparent as it often happens that one unit breaks away from the united front, like an advancing wedge. This, however, does not last long; the others surge onward too, and the phalanx is reunited in the advanced position.

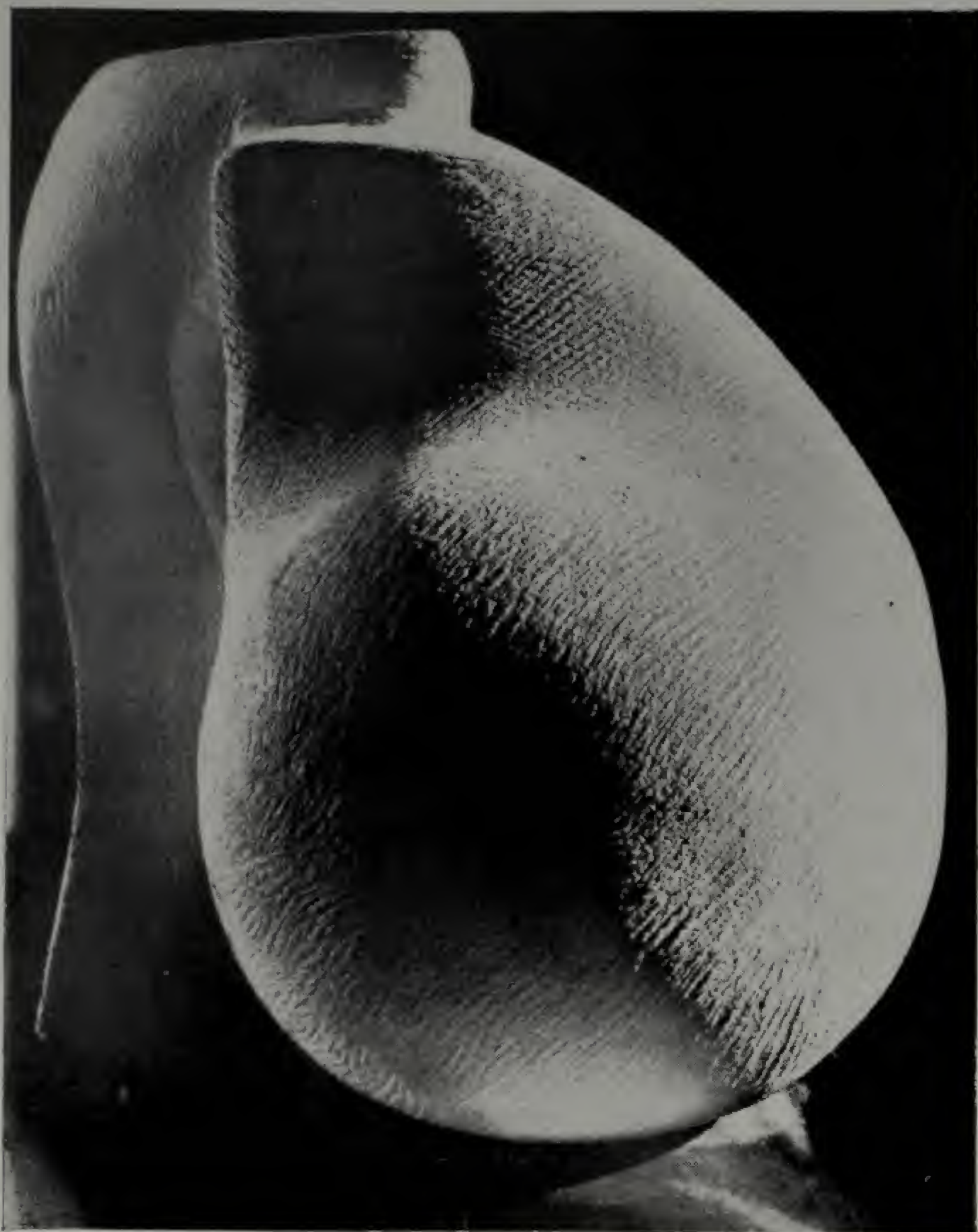


Fig. 294. O Dorothy Shepard, 1939
Sculpture (stone)

**volume modulator:
first stage (the block)**

The first stage of sculptural development is the block of material which shows its mass in plain, almost untouched volume such as the pyramids, dolmens, natural monuments, meteorites (the Caaba at Mecca), crystalline blocks, prisms.

second stage (modeled)

The modeled (hollowed-out) block appears after the first stage; small and large mass (volume), relationships of salient and sunken, positive and negative, round and angular, sharp and dull. Void can be understood as "negative" volume and it can be used as the legitimate contrast to "positive" volume. There are early examples of this treatment in totem poles and Egyptian sculptures.

Fig. 295. Umberto Boccioni, 1911

The bottle

This sculpture reveals the great desire of the early futurists and cubists to render the object more perfectly than any of the predecessors. Here the bottle is dissected and its component parts used for a composite view



Fig. 296. Jean Arp, 1933

Configuration

Arp is the sculptor "non-geometric". He once stated that in the best sculptures the elements are—as here—placed "by the law of chance". In such a sculpture the various parts can be set in an ever-changing and ever-valid relationship, because already in the single elements an organic rightness is manifest enabling them to produce an always vital configuration



Fig. 297. O Allen Leepa, 1938

Relief texture study

Fig. 298. Ossip Zadkine, 1943
Head of a child (marble)
Effective simplification by "warping" few
planes



Fig. 299. ○ Alexander Archipenko, 1935
Figure
Archipenko is the great initiator of the
positive and negative volume interrelated-
ness







Fig. 300. O Richard Filipovski, 1945
Aluminum sculpture

Fig. 302. O Warren Koepke, 1942
Sculpture (mirrored)



Figs. 301 a, b, c. O Dorothy Riley, 1940
Volume family

In the Institute of Design, the problem of the great artist has often become a stimulus in the training of the student leading to skill, intellectual and emotional concentration and spiritual elevation. But whether it be hand sculpture, or sculpture in plaster, stone or metal one's own experience of the "organic" rightness has been a most important requirement.



The remarks of Robert J. Wolff about his work with the students in the Institute of Design are especially revealing in the case of the "volume family" illustrated at the left:

"The tradition of sculpture is bound up in the touch of things. Sculpture is moulding, chipping, carving, building. It is a process which concentrates the creative intention within the boundaries of the solid, self-enclosed image. It is the tradition of monumental monologue. It is a noble and necessary tradition and it will survive.

It will survive, but it will be transformed. It will be transformed by new contrapuntal rhythms, by the architecture of space and motion, by the total influence of environment.

We ask ourselves, can the rock embedded in the earth forget its ageless, self-contained existence to embrace the air and observe the sky? And perhaps with the power of a new compulsion uproot and raise itself to new balances and buoyancies? To forget itself, and even, for the moment, destroy itself in order to discover the nature of space and the changing relationship of one thing to another. To discover this and

then to reappear in the image of this new sensibility.

This is the problem. Sculpture searches for a contemporary existence.

We begin with a lump of mud . . . a jagged mass of stone. We induce growth, metamorphose. We are unmindful of finalities. We propel the motion of change. How does the object look, now, now, and now again? We do not care. We ask, how is it changing?

We are not monologists. The incomparable individual and the exalted object bore us. We are not hypnotized by single points of reference.

So we work on a community of objects, two or three or perhaps more. We see how they reflect and embrace the same light, how they are cut by each other's shadows and contours, how they share each other's presence. We observe that a local change is a universal change, that when we touch one, we touch all. Light and air become tangible. What was once surrounding void becomes unifying space. Space and substance are as one.

We are sculptors. But in a sense we are architects, too, for we design an existence for the images we create."



Fig. 303. Jacques Lipchitz, 1930
Melancholy (bronze)



Fig. 304. David Smith, 1938
Still life

third stage (perforated)

The perforated (bored-through) block is the third stage. After mastering the relations of all degrees of positive and negative volumes, an intensive penetration into the material follows, creating polar contrasts. The completely perforated sculpture is a heightening to the very limits of hollow and solid. (Among the early examples, native work such as South Sea canoes and African sculpture is characteristic.)

succession in time

In the history of sculpture the different stages of plastic development follow each other. Each culture (Egyptian, Indian, Greek) shows at the beginning the barely modeled block, and as a next step the carefully modeled piece followed by perforations of a greater or lesser extent. The same approach is found in the sculptural work of the pre-literary natives, the so-called "primitives" (American Indian, Negro and South Sea Islanders) among whom sculptural creation rests on very old traditions.

amplification

The discovery of new materials and new tools inspired man to overcome the static rigidity of a straight block. With the use of metals, especially bronze casts, he came to new structural findings. Just as a piece of clay can be twisted, showing complicated torsions, he shaped marble and granite as if they were flexible. In fact, given his new techniques, marble and granite had become flexible. Twisting added various space directions to the material, as well as "counterpoints" of frozen motion in space—

Fig. 305. Max Bill, 1935-1937
Endless ribbon



the first step in rendering vision in motion. At the same time, this was a new potentiality to volume articulation of solids as well as in light values. With this man came to the better exploration of his means and toward a more dynamic solution of his sculptural expression.

Michelangelo said that the sculptor's task is to free with his tools the sculpture hidden in the marble block. But what a difference between the rich space curvatures he dared to see in the marble and the forms his gothic predecessors had seen! And what a difference in the mastery of tools and in the handling of material and light! The spiral twisting of bodies was not only an attempt toward vision in motion but also toward a more emphasized use of light as a medium of plastic organization. Michelangelo's sculptures show deep shadows producing sharp and hard linear definitions. On the other hand, Rodin, with an ingenious chisel-cut, introduced transparent shadows and soft contours which made his sculptures appear ethereally light. This fundamental difference of approach cautions against forming a judgment of "absolute" values of esthetics. Such values are relative and time-determined. If history is analyzed in retrospect, even "eternal" values crumble. For instance, the renaissance usually is considered as the peak of artistic efforts; but a re-evaluation shows that actually it blurred the meaning of sculpture as well as of painting. The renaissance had predominantly illustrative and imitative interests compared with the clearer and more expressive, the more direct material-and-tool-formed concepts of the prerenaisance periods. In the naturalistic illusionism of the renaissance, genuine plastic values of volume relationships in the various materials gave way to imitative handling. The flat board or canvas of a painting was covered *not* with layers of pigment but with the illusion of nature. In sculpture, the material value of marble and bronze was forgotten in the visual imitation of texture-effects of the real objects. Notwithstanding the negative influence of this deception, there were important sculptural elements highly developed, such as technical skill, sophistication of structural exploration and rich articulation of space directions. This inherited knowledge combined with the prerenaisance concept of expression-emphasis gives a striking power to contemporary sculpture.

Fig. 306. Naum Gabo, 1937
Construction in space



Fig. 307. O Institute of Design, 1944
Work by the sculpture class of Johannes
Molzahn
Rich and diversified shapes (individual
achievements of students produce an alive
relationship an outgrowth of similar atti-
tudes)





Fig. 308. Jacques Lipchitz, 1928

Woman with guitar—at Le Pradet (Var)
The contemporary sculptor tries to incorporate his work into nature. This sculpture is placed on the terrace of Madame de Mandrot's summer house (by Le Corbusier)

Fig. 309. O Dorothy Turck, 1945
Perforated volume





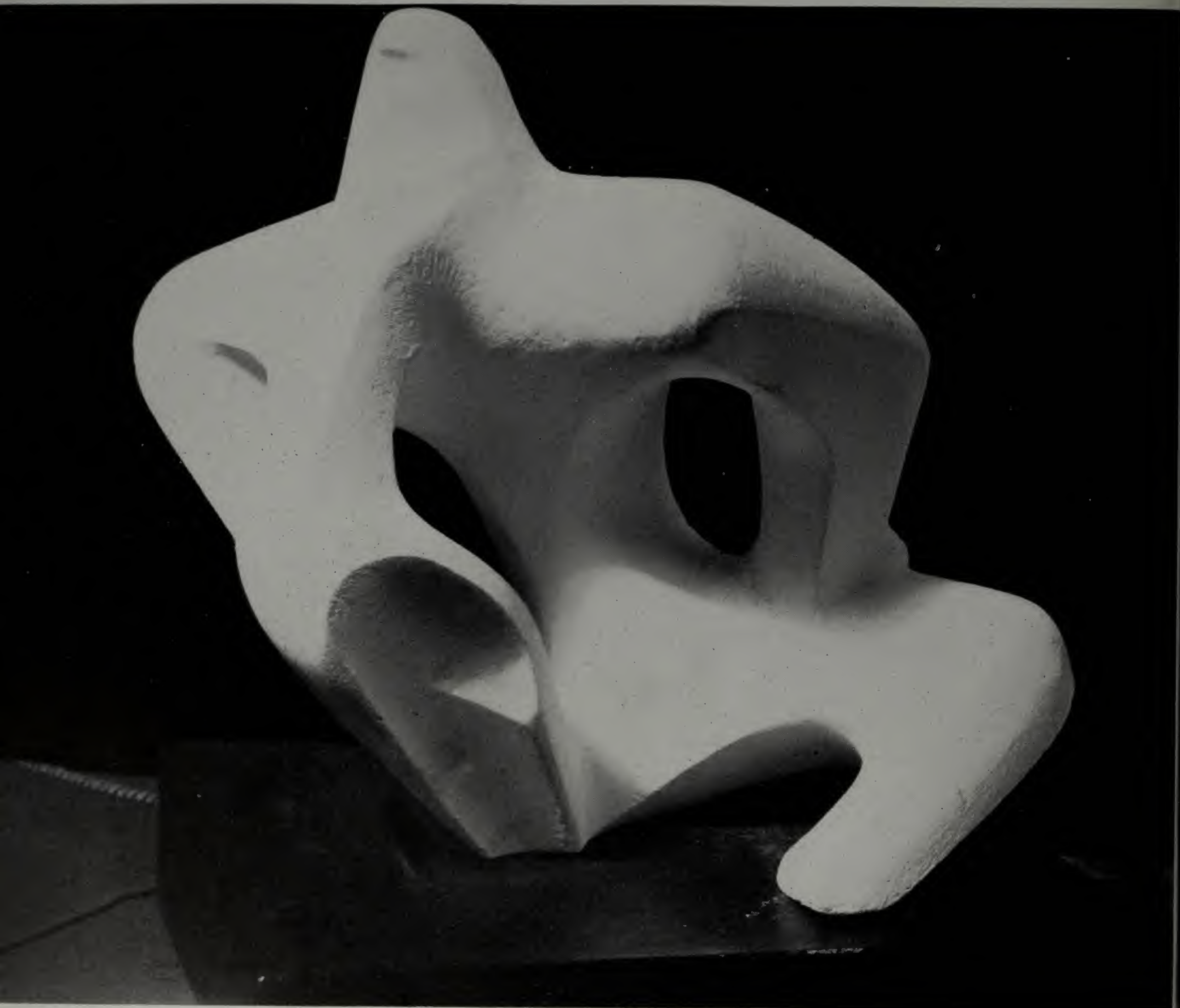


Fig. 310. ○ Calvin Albert, 1944
Sculpture

Fig. 311. ○ Robert Preusser, 1939
The mold, the cast, and the articulation
of the negative volume



Figs. 313 a, b, c, d. O Dorothy Riley, 1941
The spatial explanation of a building
by O George Fred Keck

The sculpture class under Robert J. Wolff, in cooperation with the architecture department, initiated a unique exercise for spatial comprehension. First the student makes a model of a building; then he has to explain with his own means (in this case with the sight-lines, a device seen in the top illustration) the spatial tensions prevailing among the space cells (single units) of the house, their relationship to each other and to the whole. The plastic sight-lines produced an interesting sculpture which has been then lifted out—away from the model—as "frozen vision" (shown in the bottom illustration)

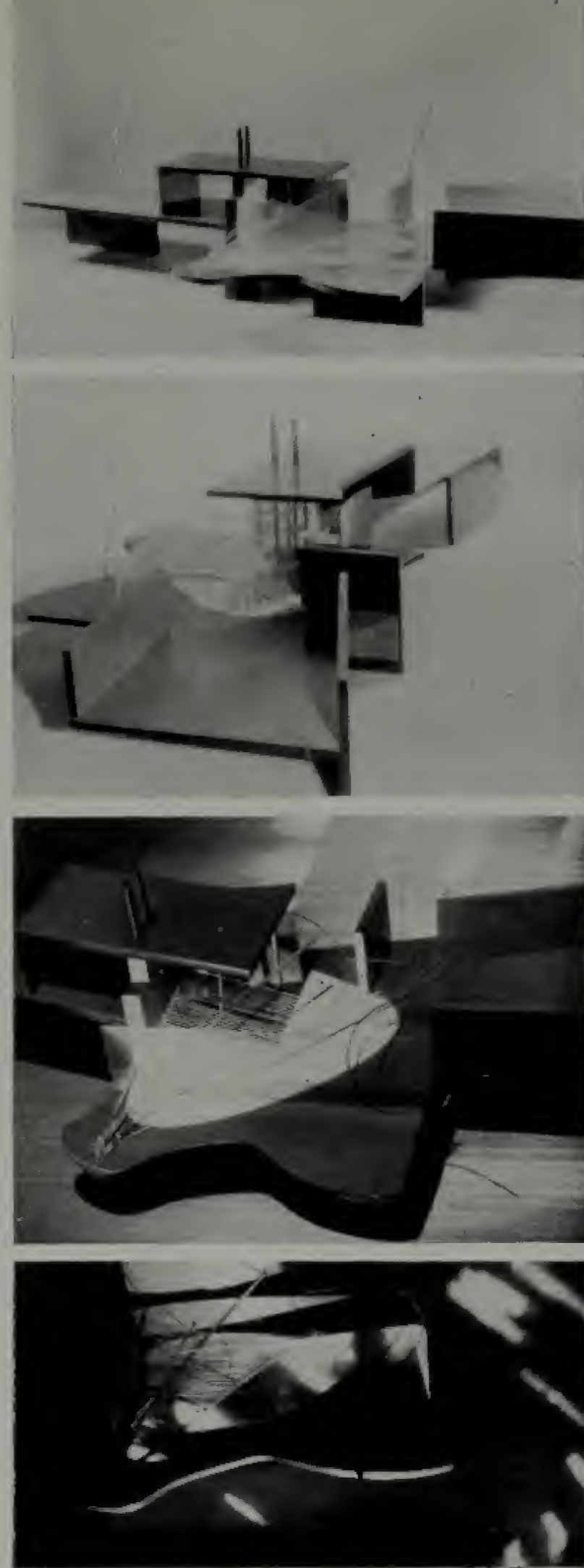


Fig. 312. O Grace Seelig, 1939

Articulation of the negative volume

The hollow plaster mold can be understood as a "negative volume". The exercise asks for the negative volume to be filled with a wire structure in such a way that this linear structure now defines the hollow. The wire structure then can be used again as a new departure for a new sculpture quite different from the original plaster cast

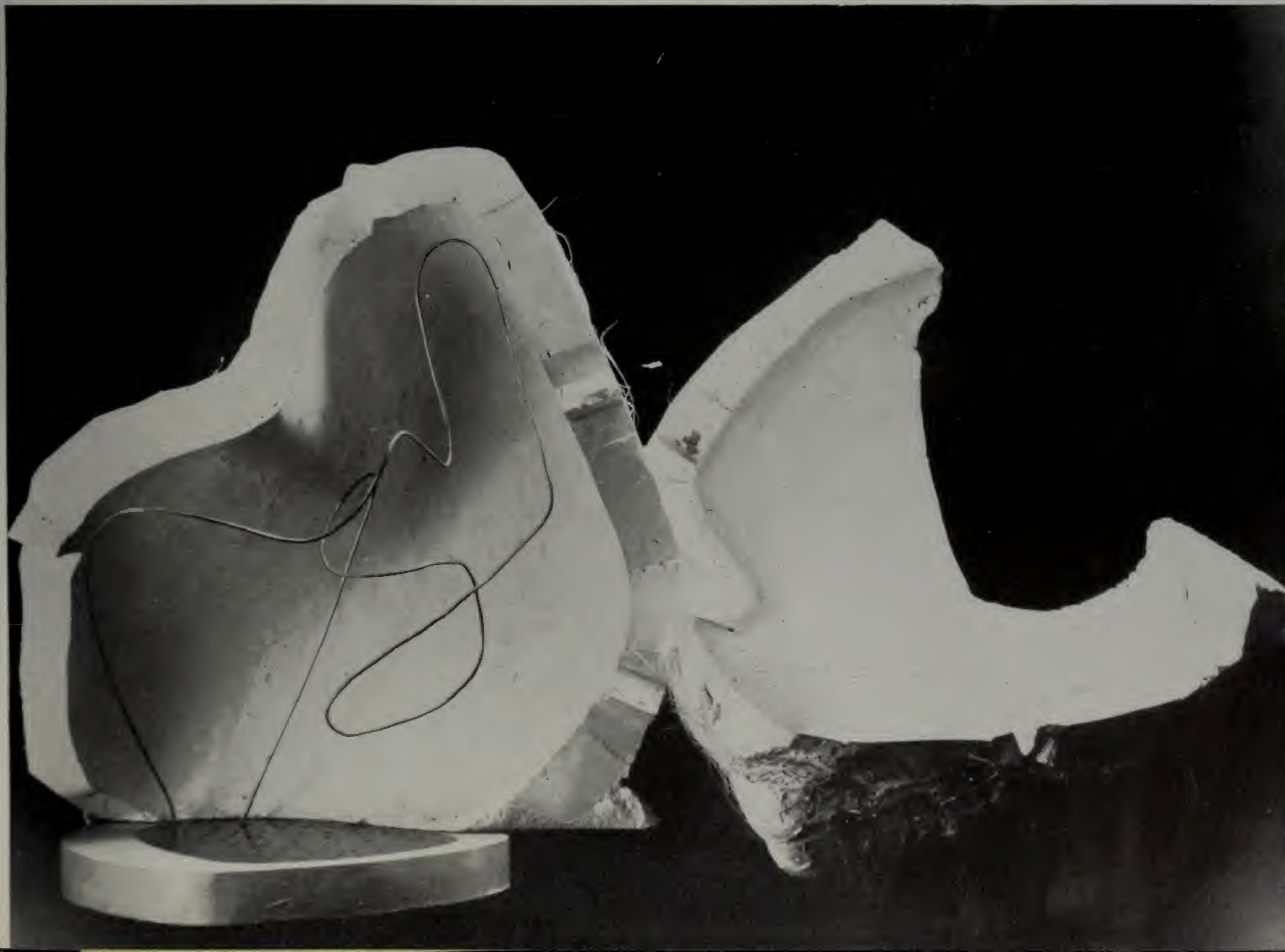




Fig. 314. O Institute of Design, 1939
Wire sculpture

Fig. 315. Walter Bodmer, 1938
Wire sculpture in the round

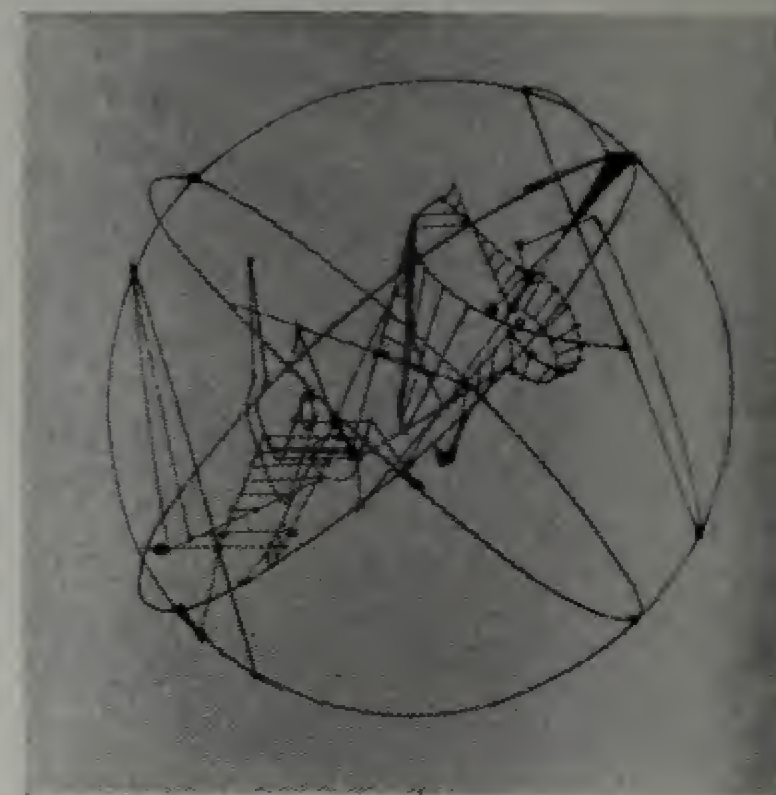


Fig. 316. L. Moholy-Nagy, 1945
Spirals of stress and strain in linear
mobility
(Plexiglas sculpture)



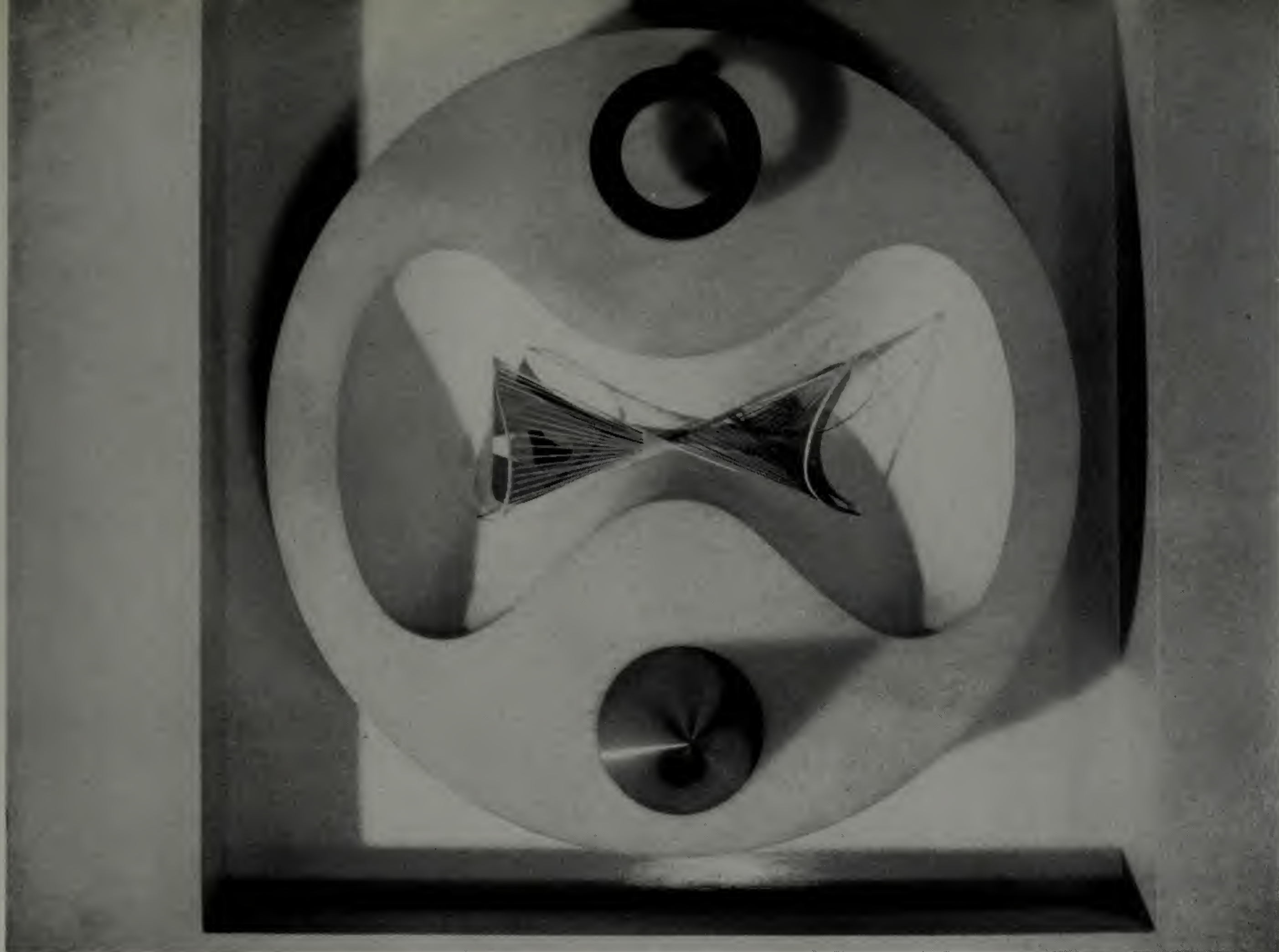
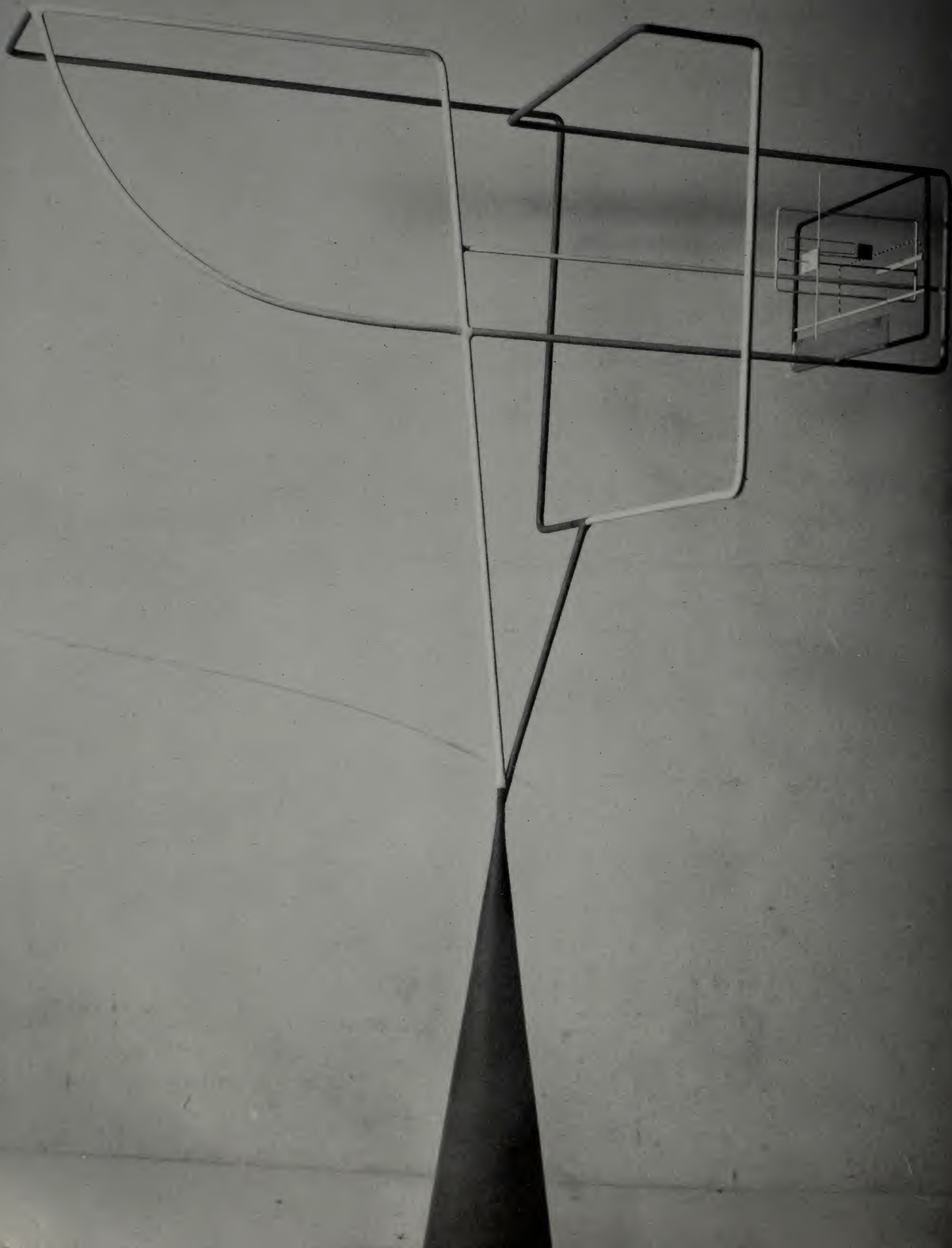


Fig. 317. Theodore J. Roszak, 1943
Construction (yellow, white and steel)

Fig. 318. Georges Vantongerlo, 1935
Y Ax-Bx Cx (metal)





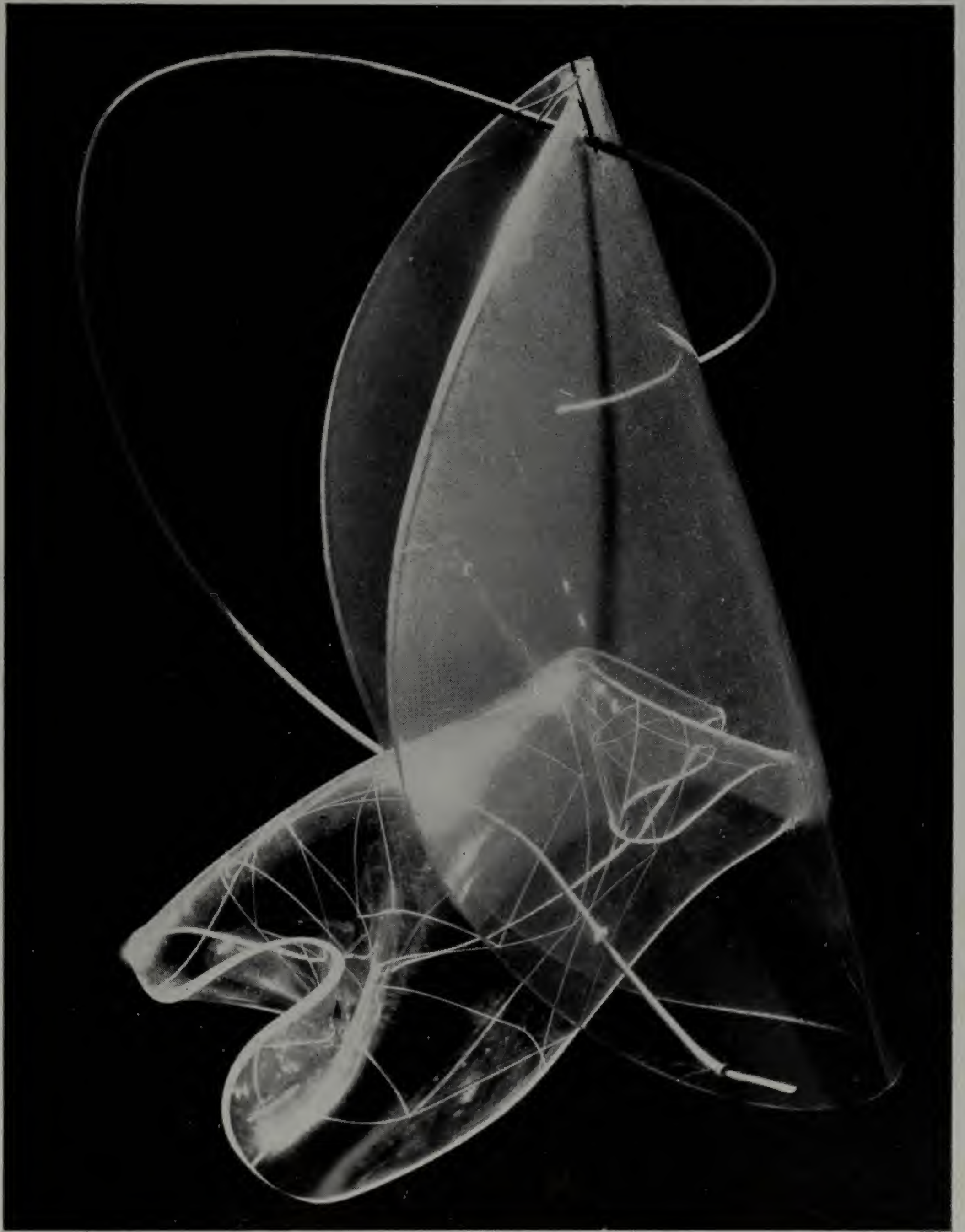


Fig. 319. Theodore J. Roszak, 1945
Spaceform structure (bent steel wire)
The new sculptor will become again a splendid craftsman, with the added knowledge of a fine industrial mechanic and modelmaker. He must know how to handle materials on the lathe, soldering, welding, and other industrial processes. The new sculpture emerging from the industrial technologies started out with the "Médrano" by Archipenko, assembled from glass, wood, and metal. Then came the constructivists' assemblies, studies in balance and motion, constructions in crystal plate glass, transparent plastics, metals, and vulcanized fibers

Fig. 320. O L. Moholy-Nagy, 1940
Space modulator (transparency plus)
Transparent plastic molded or shaped by hand is a new enrichment of contemporary sculpture. Though we have had transparent material for ages—glass—its handling was rather difficult. There have been very few important glass sculptures.

Thermo-plastics can be handled more easily than glass; they can be bent, warped, rolled and cut.

This sculpture shows three types of transparent walls circumscribed by the thick edges of the plastic or wire. One is moderately transparent (rhodoid), the second perfectly transparent (plexiglas), and the third supertransparent (air)



Fig. 321. O Curtis Rodgers, 1940
Mobile light sculpture

fourth stage (equipoised hovering)

It is pure speculation as to what comes beyond the complete perforation of the third stage. Still deeply rooted in yesterdays' tradition we can scarcely grasp the possibilities, the bold sublimations of the material, a triumph of pure relationships of the plastic elements as is shown in the equipoised sculpture, the self-contained volume. The preparation for the fourth stage can be traced in the successive steps of sculptural development. In an illusionistic way it already appeared in the gothic cathedrals, where sculptures perched precariously on cantilevered platforms, and in baroque churches where marble angels were suspended in the air.

Sculpture "normally" rests on a heavy base, occupying a certain, unalterable position in relation to its surroundings. It also has definite directional relations to the ground, horizontal, vertical and oblique. The equipoised sculpture theoretically is independent of any such direction; it contains only relationships of material and volume. All other possible elements are within its own system since it is in a hovering floating condition.

The freedom from relationships to external points characterizes the fourth stage of sculptural development. It is floating volume in space conquering the forces of gravity. This independence is at the same time the crux of the problem of equilibrium, which is an important part of the total problem of plastic creation.

This fourth stage is a long way from the renaissance idea of sculpture viewed from only one prescribed position (the mechanical application of the vanishing point perspective of paintings to a three-dimensional object). A sculpture, of course, could have been viewed from any point if the pictorial (monocular) canon of the fixed point had not had its influence upon it. The dogma of viewing sculpture from one point only and designing it to that end exploded later with the introduction of the theory of sculpture "in the round".

Equipoised sculpture can usually be, but not necessarily, understood as kinetic sculpture in balance, since objects can be best brought to a balanced rest in equipoise through the action of opposed forces. But examples of equipoised sculptures which do not depend on illusion created by the use of glass or invisible wire suspension are hard to find. True solutions are balloons, objects held up by air pressure as the celluloid balls moving on water fountains; airplanes, helicopters, the spinning top, especially the gyroscope variation. But all these examples are for the most part still limited in their formal quality by unavoidable compulsory considerations of the power (steam, water, gas, electricity) which help to overcome gravity. The actual realization of equipoised sculpture will be more easily realized by the application of magnetic forces or remote electrical control. This can be demonstrated in a simple way by an electromagnetized metal bar floating between two vertical glass plates.

Within the system of equipoised sculpture we can trace three earlier stages of the plastic modulator: the block, the modeled and the perforated.

Fig. 322. O William R. Marston, 1941
Virtual volume



Fig. 322 a. O Harriet Heiner, 1941
Kinetic sculpture
Structure with a phonograph motor. This wire mesh sculpture is rotating. Ping-pong balls in the outer frame move with different speeds as does the ball within the circular path

Fig. 323. Umberto Boccioni, 1913
Marching man
(Muscles flexed in speed)



fifth stage (the mobile)

In the successive stages of sculptural development the main characteristic is the reduction and lightening of the heavy mass so that even the normal characteristics of the material disappear. This is most effectively realized in the "mobile" or moving sculpture. Here the problem of virtual volume relationships is posed. In mobiles, material is utilized not in its mass but as a carrier of movement. To the three dimensions of volume, the fourth, the time element, movement, is added. Depending upon the speed of motion, the originally heavy block of material—the solid volume—transforms itself into a kind of ethereal extension. The "mobile" is a weightless poising of volume relationships and interpenetrations. With this transformation, the original phenomenon of sculpture—the elements of which equalled material plus mass relationships—becomes dematerialized in the abstract formula: sculpture equals volume relationships.

the history of kinetic sculpture

The history of kinetic sculpture begins far back in the ages. The first application was perhaps the Greek hydro-clock. Later, in the middle ages, came the clock displays in town halls and the more complicated automata with moving, writing, and chess playing figures. As a step toward kinetic sculpture in our time one may single out toys, advertising signs, fountains, fireworks and the like. Recently the futurists have come forward as conscious propagandists of the "dynamic" as a principle of artistic creation. Boccioni presented the first "dynamic" sculptures—such as the dynamics of a bottle, a marching man—in his book, "Pittura, scultura futurista (dinamismo plastico)". In 1912 he wrote:

"The futurists broke down the concept of repose, the static—and put forward that of movement—the dynamic. They showed the new grasp of space by bringing into contrast the *inner and the outer*."

Written as a challenge to the aims of the Russian constructivists, the "Realist Manifesto" of Gabo and Pevsner is of great interest. Here are excerpts from it:•

"Space and time are the two exclusive forms for fulfillment of life, and therefore art must be guided by these two basic forms if it is to encompass true life.

"To incorporate our experience of the world in the forms of space and time, this is the single goal of our creative art.

"We deny volume as a spatial form of expression: space can be measured as little by a volume as liquid with a measuring stick. For what else could space be beyond an impenetrable depth? Depth is the only form of expression in space.

"In sculpture we eliminate (physical) mass as a plastic element. Every engineer knows that the static power, and power of resistance of an object, do not depend on mass. One example will suffice: railway tracks. In spite of this fact, sculptors labor under the prejudice that mass and contour are indivisible.

"We free ourselves from the thousand-year-old error of art, originating in Egypt, that only static rhythms can be its elements. We proclaim that for present-day perceptions the most important elements of art are the kinetic rhythms."

In 1922 I published, in collaboration with Alfred Kemeny, a manifesto on "The Dynamic-Constructive System of Forces".• •

"Constructivism means the activation of space by means of a dynamic-constructive system of forces, that is, construction of forces within one another that are actually at tension in physical space, and their construction within space, also active as force (tensions).

"We must therefore put in the place of the static principle of classical art the dynamic principle of universal life. Stated practically: instead of static material construction (material and form relations) dynamic construction (vital constructivism and force relations) must be evolved in which the material is employed only as the carrier of forces.

"Carrying further the unit of construction, a dynamic constructive system of force is attained whereby man, heretofore merely receptive in his observation of works of art, experiences a heightening of his own faculties, and becomes himself an active partner to the forces unfolding themselves.

"The first projects looking toward the dynamic-constructive system of forces can be only experimental demonstration devices for the testing of connections between man, material, forces and space. Next comes the utilization of the experimental results for the creation of freely moving (free from mechanical and technical movement) works of art."

• A German translation appeared in "i 10", no. 7, Amsterdam, 1927.

• • "Der Sturm" No. 12/1922

Fig. 326. ○ L. Moholy-Nagy
Detail of the light display machine
(mobile)

Fig. 324. ○ L. Moholy-Nagy, 1922-1930
Motion scheme of the kinetic light display machine (mobile)

On a circular base through three transparent frames, three motion areas were created. In the one, metal flags moved with an irregular, wavy motion. In the second space cell, perforated metal discs moved up and down releasing a little ball on the top which flashed across the area from the right to the left and back again. In the third cell, a glass spiral revolved producing a virtual cone



Fig. 325. ○ L. Moholy-Nagy, 1922-1930
The light display machine

This moving sculpture had 140 light bulbs connected with a drum contact. This was arranged so that within a two-minute turning period, various colored and colorless spotlights were switched on, creating a light display on the inside walls of a cube (my motion picture, "Light display, black and white and gray", was made from this mobile; see pages 288-289)



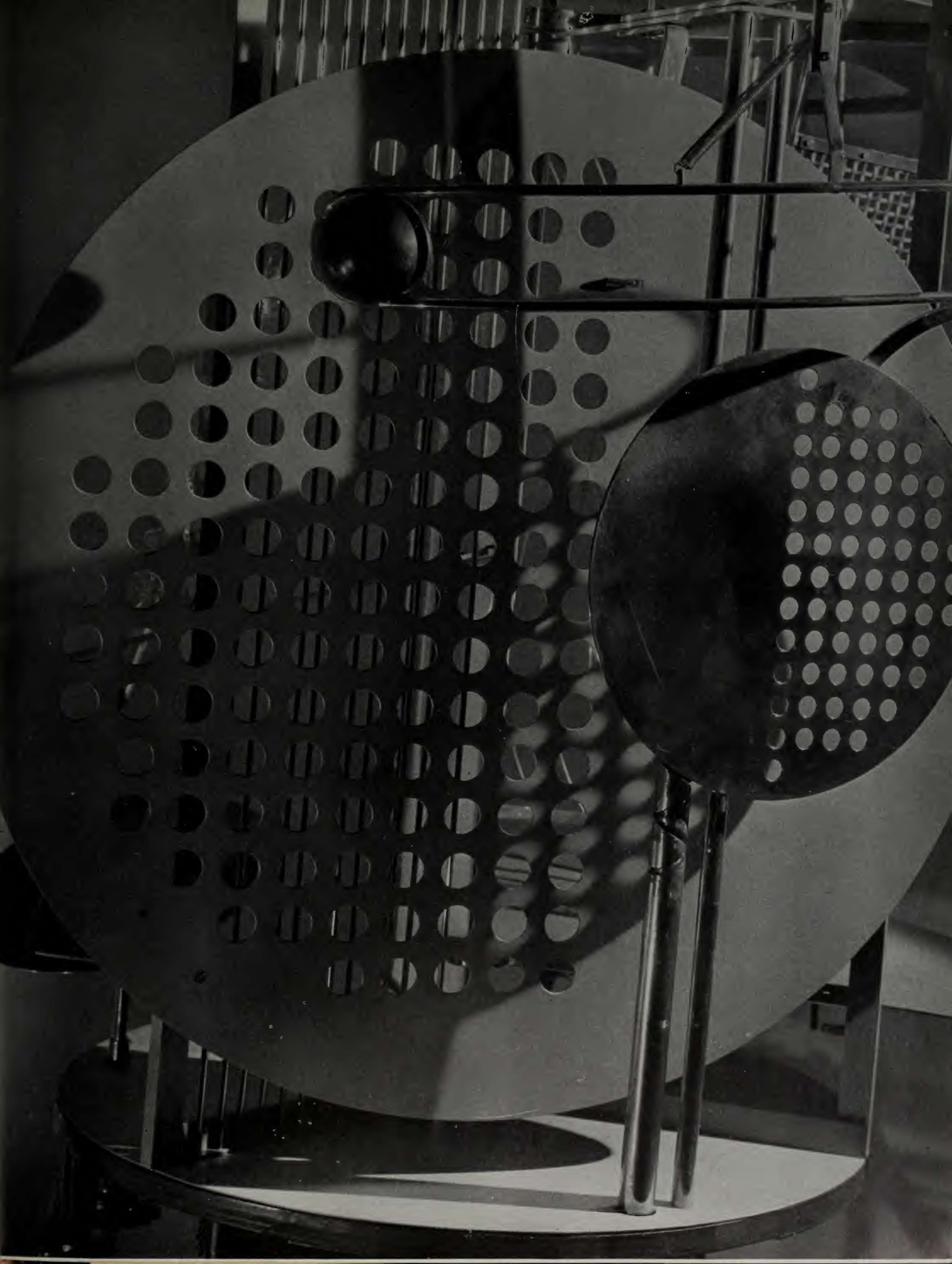




Fig. 327. Herbert Matter, 1939

Calder's (mobile) in motion

This photographic motion study is infinitely more expressive than the static picture of the original, illustrated below. We have to learn to see the new eloquence of mobile objects and all moving phenomena

Fig. 328. Alexander Calder, 1938

Mobile



Other attempts at vision in motion have been numerous. Vantongerlo, the Belgian sculptor, tried to sculpturally capture motion inside a sphere. Archipenko made mobile sculpto-paintings. Brancusi, in order to add the element of time to his otherwise static sculpture, "The Fish" and "Leda", placed them on a revolving base. Joost Schmidt's thread sculptures showed space-time potentialities of torsions. Among the young generation of sculptors Giacometti and Alexander Calder tried to demonstrate the biological experience and the plastic essential of motion in mobiles splendidly interpreted as "virtual volume" in Herbert Matter's photographs.

duality of volume

The metamorphosis of sculpture is in progress and it obliges us to use the term "volume" in several ways, though basically all volumes are members of this same family. There are three discernible meanings of volume:

1. the clearly circumscribed mass, body of measurable weight, tangible in three dimensions;
2. the negative volume, the void, the hole and opening; they are perceived merely visually through their limiting walls; they are, although bodiless, outstanding plastic elements;
3. volume produced by the motions of points (smallest bodies) or by the motion of linear elements or larger bodies. The result is virtual volume, a new element of plastic creation.

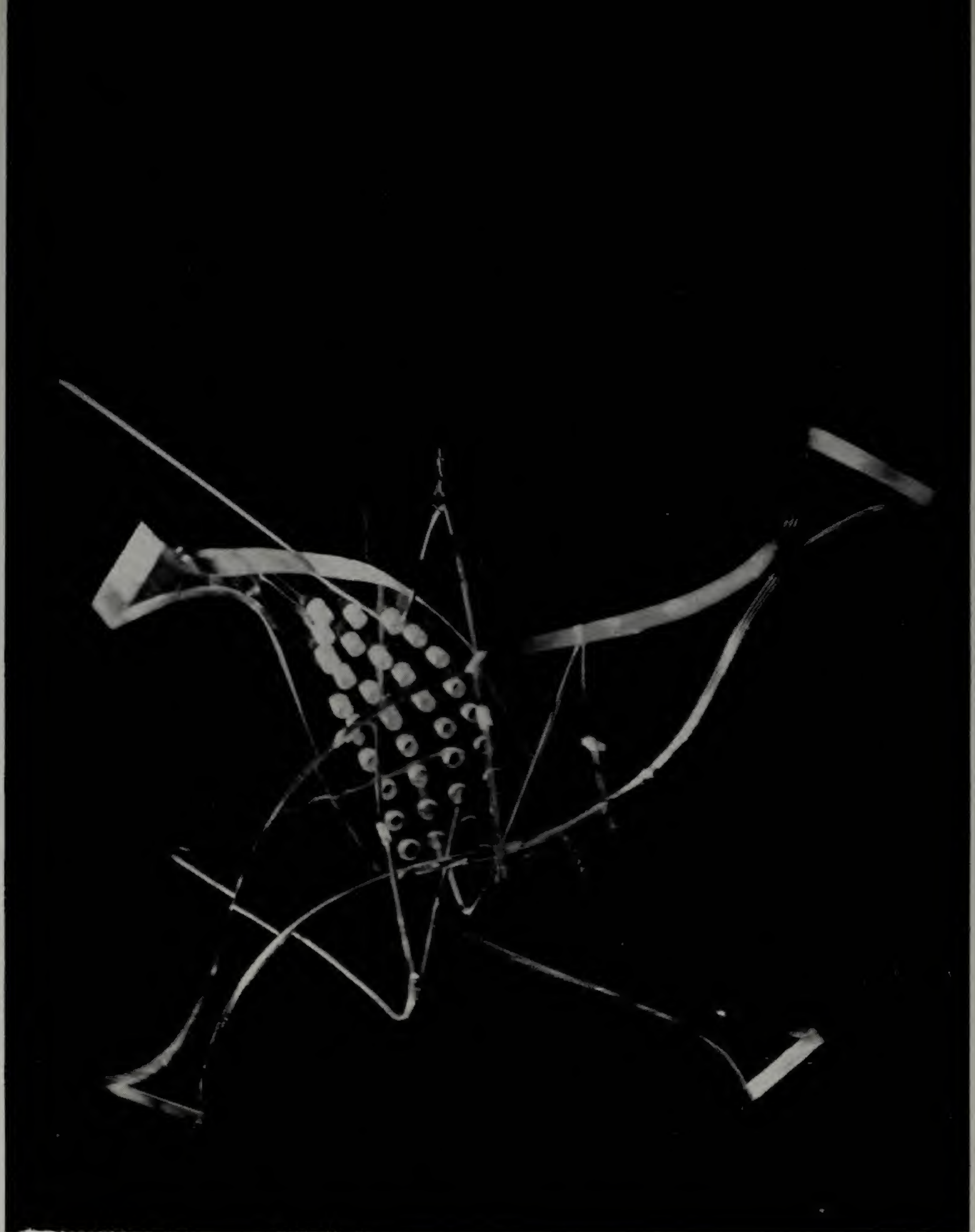
To sum up: sculpture is both material volume and its transformation into virtual volume; it has tactile existence but may be changed to visual grasp; from static to kinetic; from mass to space-time relationships.

sculptural development and emotional experience

To define sculpture on the basis of technological development is far from an exhaustive treatment of the problem of sculptural creation. It means only the first step toward a really thoroughgoing experience. The five stages of plastic development offer merely a rough differentiation of the outward technical conception. They are an introduction to the first recognition of the creative problems involved in perceiving sculptural form. The complete experience of a work of sculpture implies, along with an emotional, basic grasp, knowledge of other elements as well. There are the geometrical and biotechnical elements of construction, laws of light, motion, size, mass (proportion), relationships of structure, texture, surface treatment, representation, expression, etc.* As everywhere, here too a wide comprehensive knowledge of characteristics and elements is less important for creative work than the capacity and courage to build up new relations out of the elements of expression at hand. It is the right of the artist to select and reject elements.

What actually raises them above a commonplace meaning is the new complex relatedness given them by the shifting of their impact. Without this shifting, elements, whether many or few or intriguing by themselves, can never grow into an organism-like structure. They can only form an aggregation of parts, representing perhaps an arrangement, a rich arabesque, but remaining without significance for the biological "nourishment" of man.

* *Raoul France, the Hungarian biologist, has distinguished seven biotechnical constructional elements: crystal, sphere, cone, plate, strip, rod and spiral (screw). He maintained that these are the basic technical elements of the world and suffice to bring all constructive processes to their optimum.*





Figs. 329-330. ○ L. Moholy-Nagy, 1940
Space modulator with perforations and
its virtual volume



space-time problems



Fig. 331. The Cathedral in Metz
Such a dome was the work of generations into which they put their best. This illustration shows a rich space articulation starting out with the wrought iron gates continuing with numerous space cells into the far distance of the nave, amplified by the repeated and disappearing arches in the perspective

Social conditions, the arts, sciences, the development of an industrial technology with prefabrication, new materials and new processes are the determining factors to realize the new architectural development. From them the architect and planner will draw inspiration and factual knowledge, resulting in a changed conception of space. Every great period in human civilization organically creates its particular spatial conception. Though such space conceptions were utilized in the construction of shelter, they were also frameworks for the articulation of visual arts, play, dancing, lighting; in fact, for the mastery of life in every detail. •

The history of articulated space, the special space conceptions of different periods, have been determined by the grasp of one, two, three or more dimensions.

The magnificence of the Egyptian temple could be comprehended by walking through a basically one-dimensional straight line, the sphinx alley, leading towards its facade.

Later the Greek architects of the Acropolis designed a two dimensional approach to the temple so that the visitors had to move through the Propylaen, between the Erechteion and Parthenon, around the colonnades toward the main entrance.

The gothic cathedral also applied this concept most intriguingly to the interior. The spectator was placed in the midst of the nave, vaults, balcony and choir, and became the center of coordinated space cells of all directions.

The renaissance and the baroque brought man into closer contact with the inside and outside of the building. Apart from the "hanging gardens" of Semiramis and the Moorish-Spanish architecture, these were man's first attempts to integrate building and nature, not merely fit building into its surrounding. In our age of airplanes,

• See the "space" chapter of "the new vision".

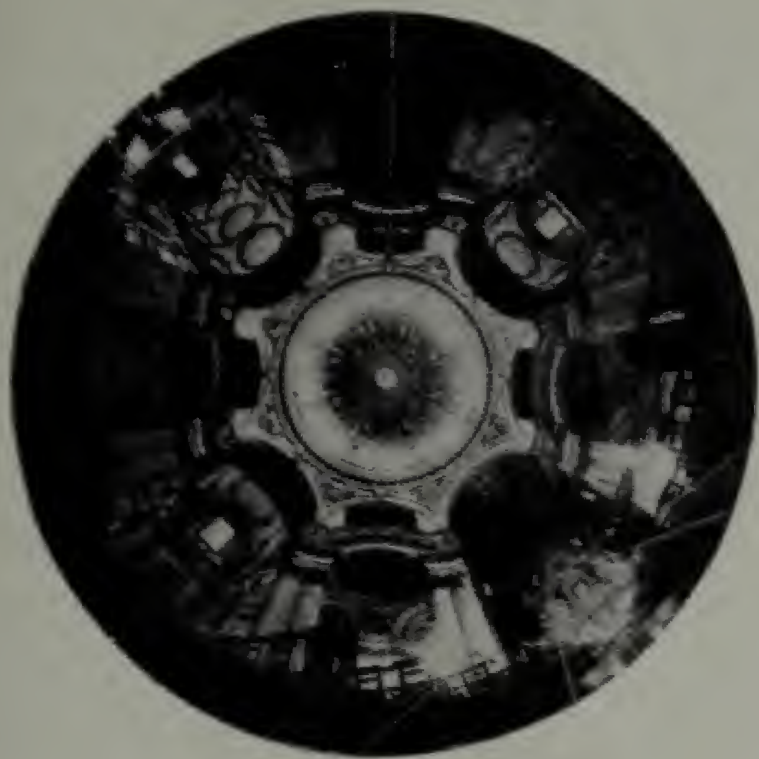


Fig. 332. St. Paul's Cathedral, London, 1936
A composite perspective (fisheye view)

architecture is viewed not only frontally and from the sides, but also from above—vision in motion. The bird's-eye-view, and its opposites, the worm's and fish-eye-views, have become a daily experience. Architecture appears no longer static but, if we think of it in terms of airplanes and motor cars, architecture is linked with movement. The helicopter, for example, may change the entire aspect of town and regional planning so that a formal and structural congruence with the new elements, time and speed, will manifest itself.

Already the great spans of large airplane hangars require a new departure for space articulation since the columns, which former architecture used as a most effective means in modulating and articulating space, have been eliminated. But the problem of space articulation in contemporary architecture is a simple affair in comparison with the complex problems of planning for a new space comprehension caused by the infinite acceleration of speed.

rendering motion (space-time) on the static plane

Motion in space can be grasped if its reality is perceptible through the senses. Difficulties arise only if illusionistic motion has to be perceived, as in the cubist paintings which rendered objects as if the spectator were moving around them.

These interpretations of vision in motion denote not only an artistic achievement but also an important practical step in visual perception as well as in the skill of rendering. The mass construction of war planes, for instance, called for complex working instructions. But the workers could not comprehend their tasks through references contained in the customary blueprints. Factories had to resort to new methods of visualization called "production illustration" mainly derived from the findings of contemporary painters, photographers and motion picture men, all of whom tried to translate the space-time sequence of production into a visually perceivable language. In this way a speeding up of the work was accomplished. This process is only in its infancy. Photomontage, superimpositions, diagrams, explosion, phantom, x-ray, cut-away techniques, stroboscopic motion projections and other combinations may enlarge its scope tremendously.

speed

Motion, accelerated to high speed, changes the appearance of the objects and makes it impossible to grasp their details. There is clearly recognizable difference between the visual experience of a pedestrian and a driver in viewing objects. The motor car driver or airplane pilot can bring distant and unrelated landmarks into spatial relationships unknown to the pedestrian. The difference is produced by the changed perception caused by the various speeds, vision in motion. To prove this Jean Carlu, the eminent French poster designer, made an experiment in 1937. He mounted two posters on two conveyor belts which moved at different speeds. The one poster, made by Toulouse-Lautrec around 1900, was moved at six to seven miles per hour



Fig. 333. Charlotta Rudolph, 1925
Action photograph of the dancer Palucca
An early motion study of a sequence of "frozen" instantaneous movements



Fig. 334. Henri Toulouse-Lautrec, 1864-1901
Painting



Fig. 335. John H. Stickell, 1942
Action photo of a bomber in a searchlight hunt
With an open camera shutter, the film recorded this picture of a flight over Germany. The broad waves are searchlights hunting the moving plane. The waves result from the combined movements of the lights and the diving of the bomber. The dots are anti-aircraft batteries firing at the plane

(approximately the speed of a horse and buggy); the other, a contemporary poster, was moved at fifty miles per hour (the speed of an automobile). Both posters could be read easily. Then Carlu accelerated the speed of the Toulouse-Lautrec up to fifty miles per hour, and at this speed the poster could be seen only as a blur. The implications are obvious. The artist, architect, advertising and display man, must count with the quickly moving vehicles requiring a new orientation toward spatial organization and communication. A new viewpoint in the visual arts is a natural consequence of this age of speed which has to consider the moving eye. (And what an improvement it would be if the signmakers of streets and highways were also aware of this fact.)

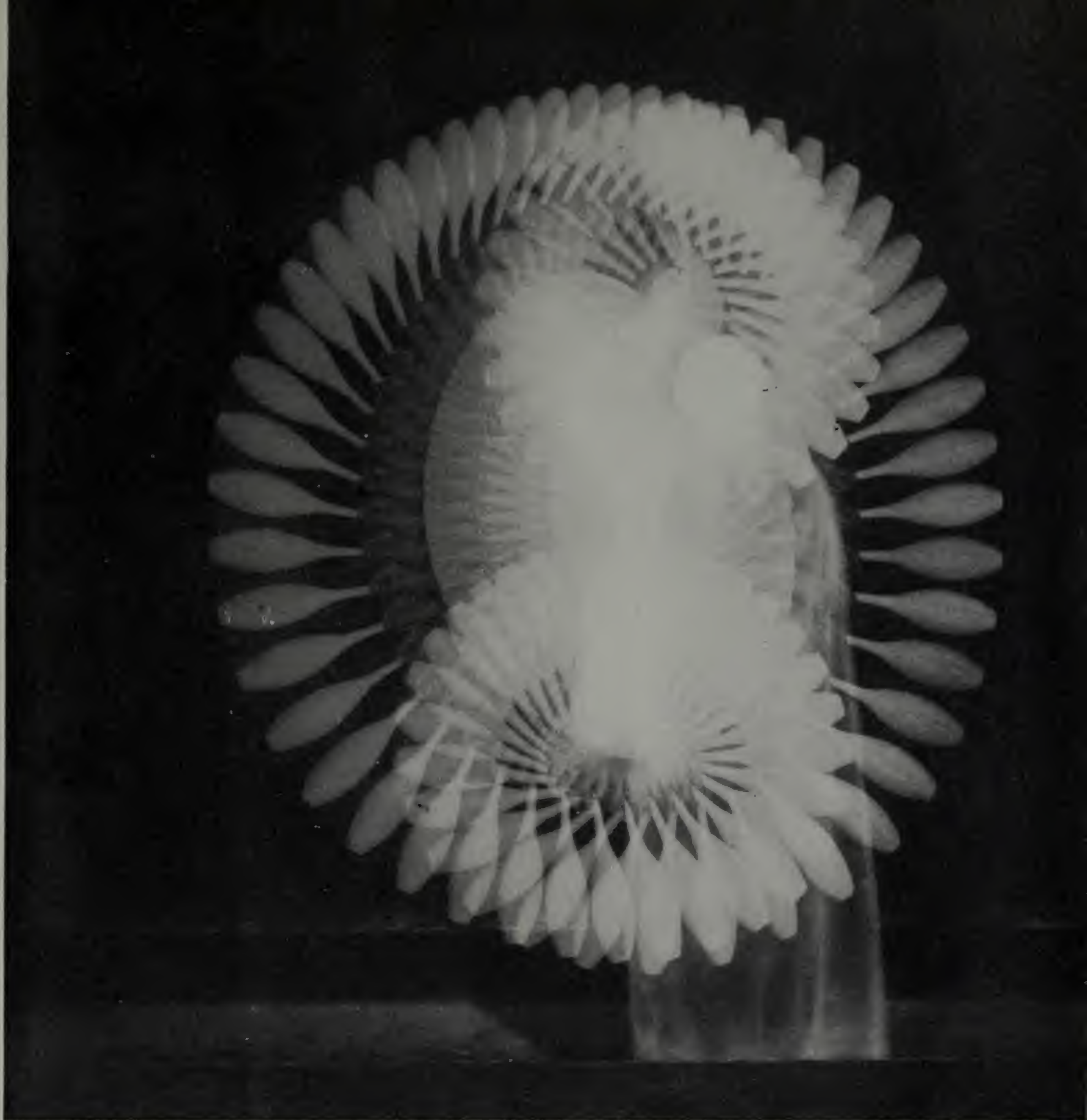
Jean Labatu (Princeton University) had the task of preparing effective outdoor advertising for a factory site half a mile long, situated along a highway with heavy motor traffic. Studying the problem, he found that the required water displays, fountains, light, even the shape of the pool which had to mirror the buildings, had to be related to the speed, that is, the rapidly changing position of the spectator at the wheel. On the basis of calculations as to time and vista, he suggested a "time facade". It consisted of continuous mobile light and water displays placed so that they could be perfectly seen in 30 to 60 seconds, the time it took a car to drive along the site at 30 to 60 miles per hour. Such an approach translates the static meaning of advertising into a kinetic process, "shooting at a moving target".

Photography, motion pictures, the speed studies of futurism and cubism handled such aspects intuitively, anticipating the vision in motion of a motorized world long before an actual need existed for a new visual education based upon scientific standards. Safe air travel, for instance, is greatly dependent upon the skill and visual alertness of pilot and navigator. Their vision in motion—especially at landing—the flashquick ability to identify small details within vast areas, has to be conditioned to the new validities of speed since even radar or other mechanical equipment can fail.

Fig. 336. Harold Edgerton, 1937

Indian club exercise

In such a stroboscopic photograph the velocity of the motion can be read through the various distances between the single shots of the club, since they all have the same time measurement of exposure



analysis of speed

Speed itself can become the subject of a visual analysis. We know of innumerable photographic shots of arrested motion such as sport scenes, jumps and dives. On the other hand we can observe slowly unfolding buds, moving clouds taken at intervals; similarly the effect of time exposures of moving objects on streets and merry-go-rounds. Experiencing speed that can be arrested, rendered, stretched and compressed, in short, articulated, we can state that we have possession of it, that we are approaching a new vocabulary of space-time.

Harold Edgerton (M.I.T.) found a new way to render speed in stroboscopic photography.[•] The relationship between the velocities of the dissected movements gave him the clue to improving the action of golfers, turbines, spinning wheels and various kinds of machinery. These pictures are juxtaposed details of frozen move-

[•] Thomas Eakins, American painter, when collaborating with E. Muybridge in recording speed, made similar photographs as early as 1881-84 as Charles Bregler reported in the "Magazine of Art", January, 1943.

From the manifest of the futurist painters, 1912:

"Indeed, all things move, all things run, all things are rapidly changing. A profile is never motionless before our eyes, but it constantly appears and disappears. On account of the persistency of an image upon the retina, moving objects constantly multiply themselves; their form changes like rapid vibrations, in their mad career. Thus a running horse has not four legs but twenty, and their movements are triangular".

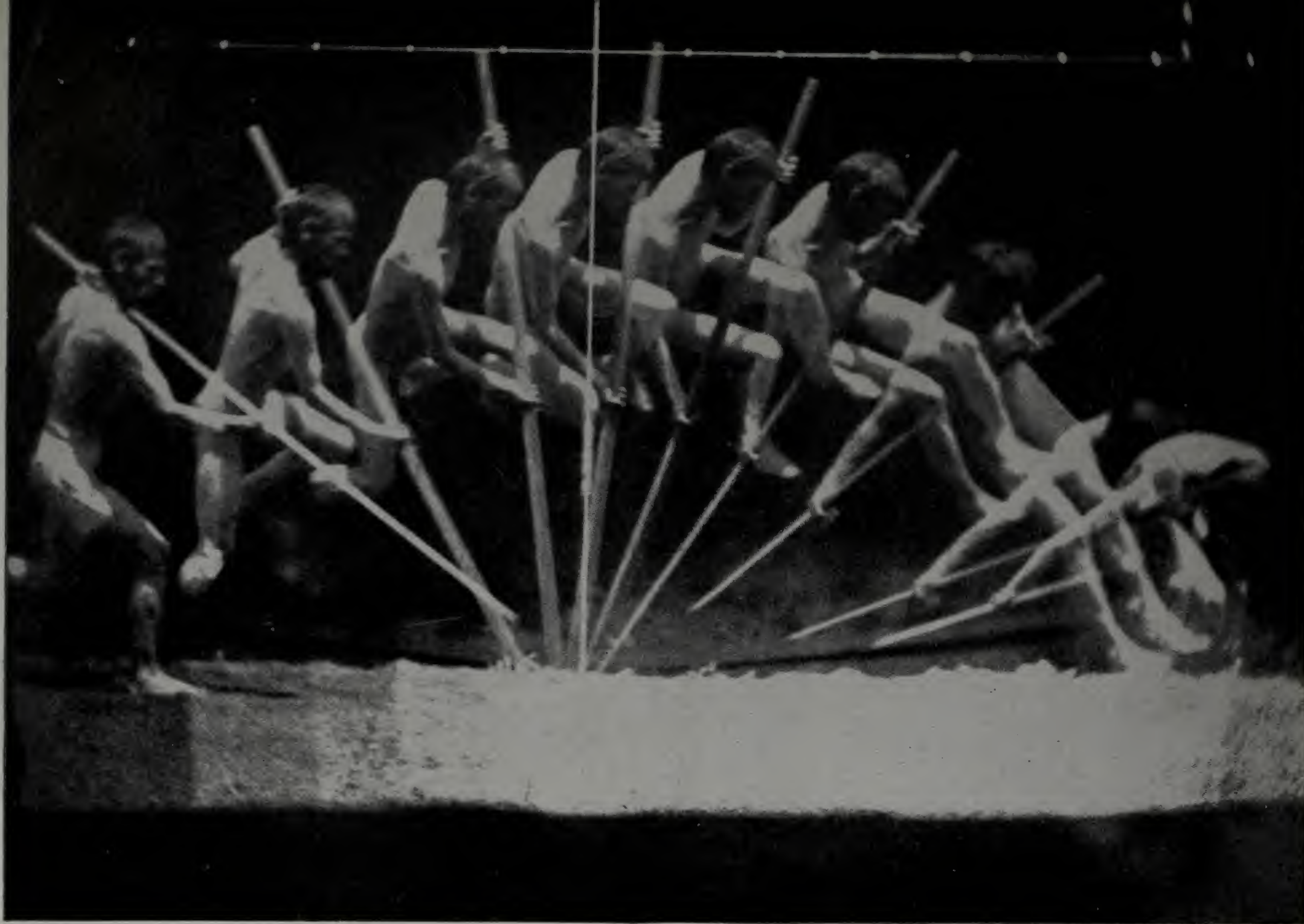


Fig. 337. Thomas Eakins, 1881-1884

Action photo

Although we generally consider the futurists' attempts to render motion as the earliest, the truth is that even the spectacular motion photographs by Professor Edgerton (1937) are preceded by the work of Muybridge, and almost literally by Muybridge's collaborator, Thomas Eakins

ments analyzable and in relationship to each other and the whole cycle of motion. They clearly show that space-time can not only be articulated but also employed as a means of expression. These speed photographs are of more recent date, but they are astonishingly similar to futuristic paintings. In fact, they are their exact repetitions: e.g., "Dog on the Leash", 1912; "Speed", 1913, both by Balla; "Nude Descending the Stairway", 1912, by Marcel Duchamp. They all show the same juxtaposition of frozen movement.

The problem of futurism is similar to that of cubism. The difference is that cubism takes to motion as a means of better grasp of the object in space; futurism is interested in motion for the sake of motion. Although both used superimpositions, most of the futurist paintings seem merely a new naturalism beside the spatial sophistication of cubism.

Around 1910 the futurists had begun to emphasize movements, saying, "The world's splendor has been enriched by a new beauty—the beauty of speed. . . ." "We shall sing," they continued, "of the man at the steering wheel. . . . Who can still believe in the opacity of bodies since our sharpened and multiplied sensitiveness has penetrated the obscure manifestations of the medium? Why should we forget in our creation the double power of our sight, capable of giving results analogous to those of the x-rays?" Umberto Boccioni in "Power of the Street", 1912, projected such a double power of sight and such a fusion of the manifold elements of a street,

Fig. 338. Umberto Boccioni, 1911

The power of the street

Boccioni said about this picture in an exhibition catalog, March 1912, (Sackville Gallery, London): "The tendencies, dynamic power, life, ambience, anguish, which one experiences in the city; the crushing sense of modern bustle"



Fig. 339. Marcel Duchamp, 1912
Nude descending the stairway



Fig. 341. Carlo D. Carra, 1911
The funeral of the anarchist Galli
The futurist painting, attempts the rendering of a motion dynamics. The "dramatic interpretation of the scuffle between the cavalry and the proletariat"



Fig. 342. Pablo Picasso, 1936
Guernica (mural)
This picture translates the anger and desperation about the Nazi bombing of Guernica into a plastic demonstration. Besides the symbolic significance of the painting (the bull stands for fascism, and the horse turning around in pain for the loyalists), it is the motion of the figures itself which conveys the real meaning



Fig. 340. Herbert Matter, 1941
Figure in movement

into one simultaneous, expressive representation. Pablo Picasso did the same in the mural of the bombing of Guernica, the Basque city. The painting is a monument of human torment and a powerful symbol of the agony of the heroic Spanish loyalists. Visiting him in 1937, before the painting was placed in the Spanish Pavilion at the Paris World's Fair, he said that he had attempted to render "*the inside and outside of a room simultaneously*".

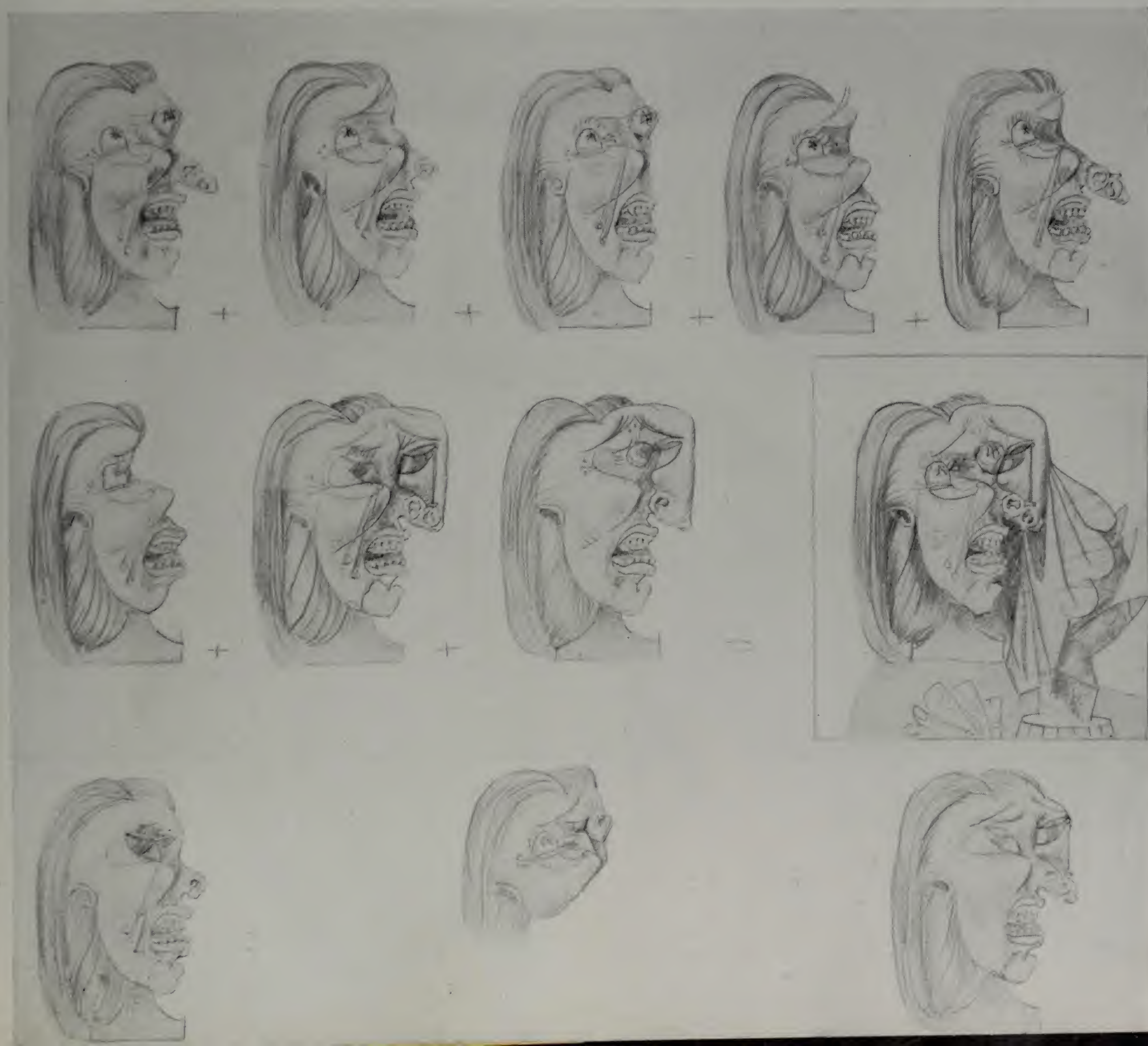
Among the Guernica studies which Picasso made there are a number of drawings which record not only the space-time visualization of the successive changes of physical motion, but also the psychological space-time, the emotional metamorphosis caused by horror in the doomed creatures.



Fig. 343. Pablo Picasso, 1936
Sketch for Guernica mural (etching, second stage)

Figs. 344 a, b, c, d, e, f, g, h, i, j, k, l O
The face opposite is a psychological space-time study expressing the horror of bombing. A young matron changes into an old woman with the distorted features of a terrified creature. The pencil sketches charting the changes are by Robert Santmyers, student of the Institute. Turning the large etching upside down, one sees Hitler's caricature topped by a frightening headgear

In the old arts, horror was usually rendered through the distortion of the facial muscles, distortion of the open mouth, by enlarged and protruding eyeballs. Picasso intensified this approach by moving and distorting the usually immovable and undistortable elements of the body, such as the eyes, ears and nose. In "Guernica" he shifted the eyes away from their normal position; he turned the ears upside down. In the studies for the mural he transformed the eye into a cup and the lower eyelid into a saucer from which tears poured. He exposed the tongue of a screaming, horror-stricken victim as a flame, at other times as a dagger to signify despair. In one of these studies he showed a dozen variations of a face, changing the profile of a young mother under the impact of unspeakable suffering—into the distorted, crumbled features of an old woman. This was done through interweaving the features of a panicky, quickly aging, hideous creature, each expression growing out of the other without breaking the oneness. The same etching, if looked at upside down, solved the enigma by displaying the deteriorated, piggish visage of Hitler,





Figs. 345-346. Harold Edgerton, 1940
Multiflash of the "Martels", an acrobatic team

The photograph at the right records the sequence of movement in superimposed flashes. The girl, thrown into the air by the acrobat, is caught by him. Observe in the closeup on the left the position of the man's

eyes. Through the superimpositions of the various phases of movement, the eyes in his "faces" appear in strange distortion, similar to the eyes of the Picasso etching for the Guernica mural (see pages 250-251). Here again distortion equals motion (see figs. 151, 152, 153, 156, 157, 236, 275, 276, 277b, 279, 283)



Fig. 347. Xanti Schawinski, 1945
Pluralistic head

Fig. 348. Dream
Superimposition of the different scenes from a motion picture



the cause of the bestial destruction. The old technique of the trashy "double image" postcards was used here with unusual subtlety to make the psychological space-time as transparent as an x-ray photograph.

transparency and light

The passion for transparencies is one of the most spectacular features of our time. In x-ray photos, structure becomes transparency and transparency manifests structure. The x-ray pictures, to which the futurist has consistently referred, are among the outstanding space-time renderings on the static plane. They give simultaneously the inside and outside, the view of an opaque solid, its outline, but also its inner structure. They have to be studied to reveal their meaning; but once the student has learned their language, he will find them indispensable. In my pictures I have tried to follow this line of space-time articulation by painting on waterclear, transparent plastics, introducing direct light effects, mobile reflections and shadows, indicating a trend away from the static pigmentation of surfaces toward a kinetic "light painting". The problem is only how to control these colored "light paintings" with the same precision as the painter of yesterday controlled the effects of his pigments. (Figs. 189, 203, 205, 213-215, 356)

photographic practice

Different space and time levels usually appear in photographic rendering as superimpositions. The reflections and transparent mirrorings of the passing traffic in the windows of motor cars or shops are one example. Mirroring means in this sense the changing aspects of vision, the sharpened identification of inside and outside penetrations. In such renderings there is a blending of independent elements or events into a coherent whole. Superimposition of photographs and distortion by reflection, as frequently seen in motion pictures, can be applied as a new visual language to represent dreams, acting as a space-time symbol, even synonym.

Fig. 349. L. F. Ehrke and Dr. C. M. Slack, 1941

Man shaving (x-ray photograph)

Photograph taken at $1/1,000,000$ of a second in the Westinghouse Research Laboratories, Bloomfield, New Jersey.

The electric razor was going full-speed, its tiny motor making 116 revolutions per second. Pictures may be made of larger motors, even though covered with heavy metal. Note the ring on the finger, the watch, the glasses, and the sharply defined mechanism of the razor

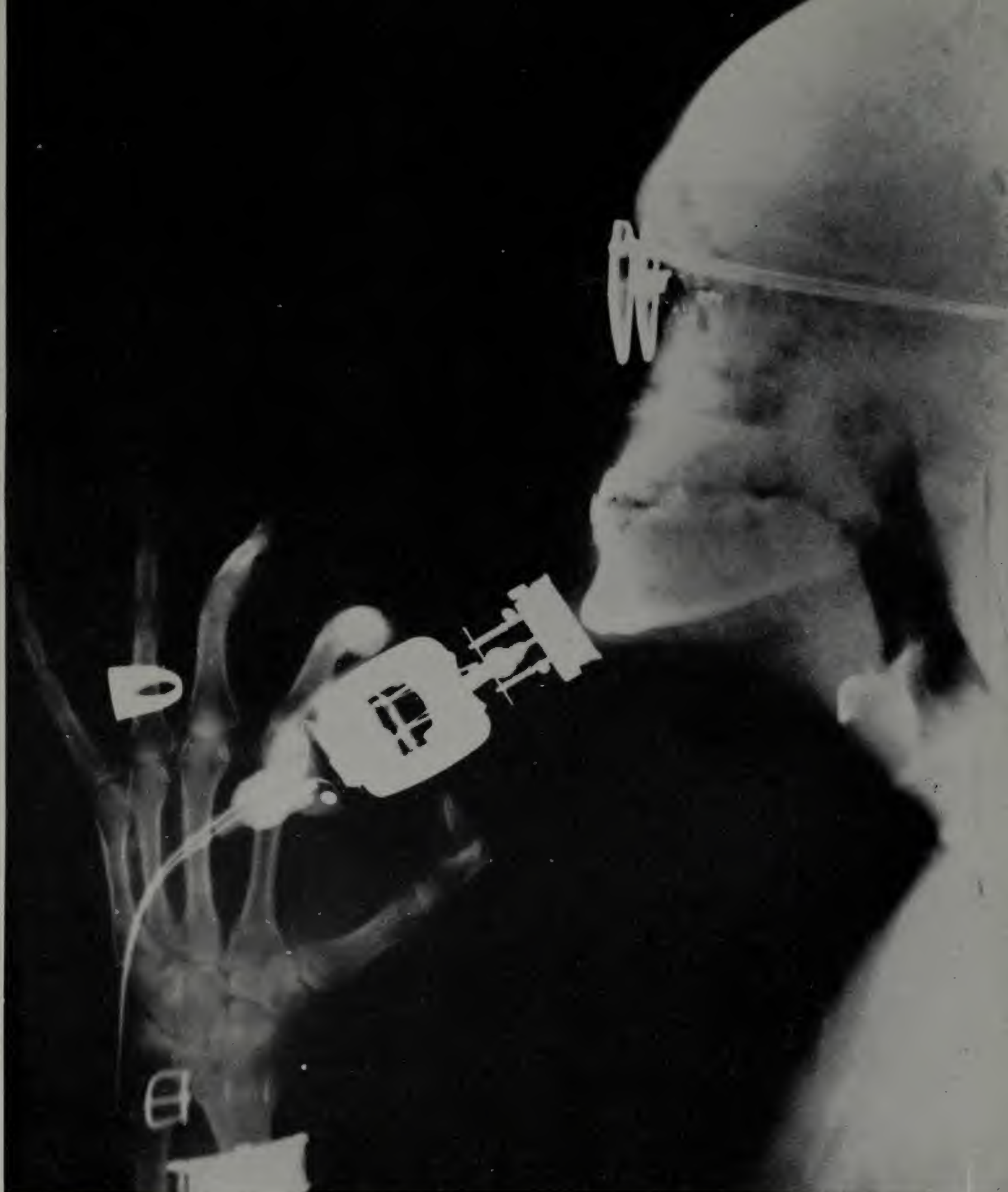


Fig. 350. Jellyfish

The transparent body discloses the shape, surface as well as the inside structure

Figs. 351 α , b. Prof. Laue, 1929

Atom structure of metal (x-ray photograph)

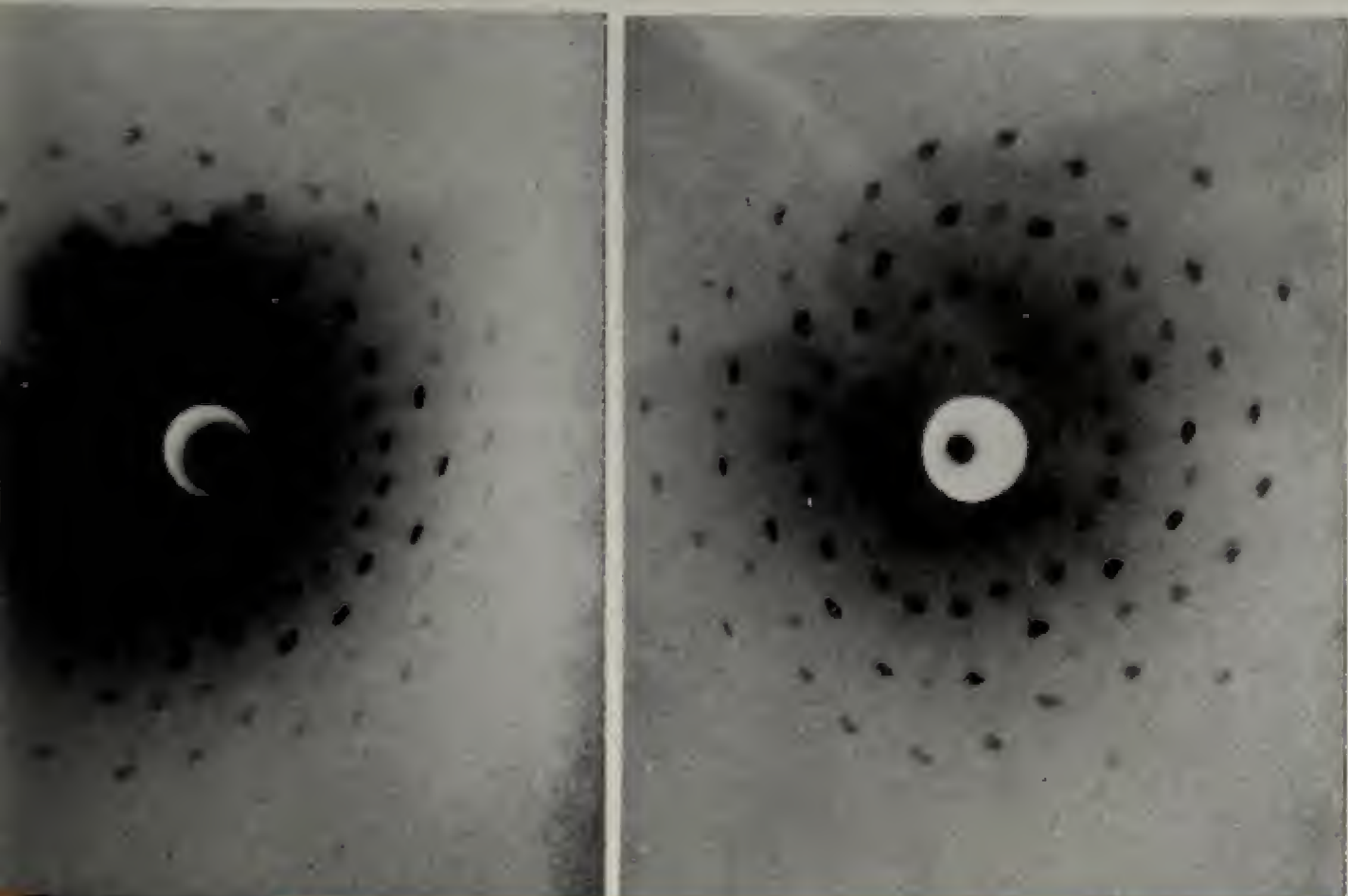




Fig. 352.

These ten single photographs of boys having the best grades in their class disclose their unified characteristics in the superimposition, Fig. 353.

Fig. 353. The "good boy", 1930



Fig. 354. Andrew G. De Narie, 1939

Triple reflection

The son of Mussolini guarded by Department of Justice men at the Newark Airport. This is an automatic photomontage produced by uncontrolled circumstances of light and dark reflecting areas. Such effects—the inside and the outside at once—photographed almost with an x-ray precision, will be a conscious concern of the photographer of the future



Fig. 356. L. Moholy-Nagy, 1936

Space modulator (Rhodoid)

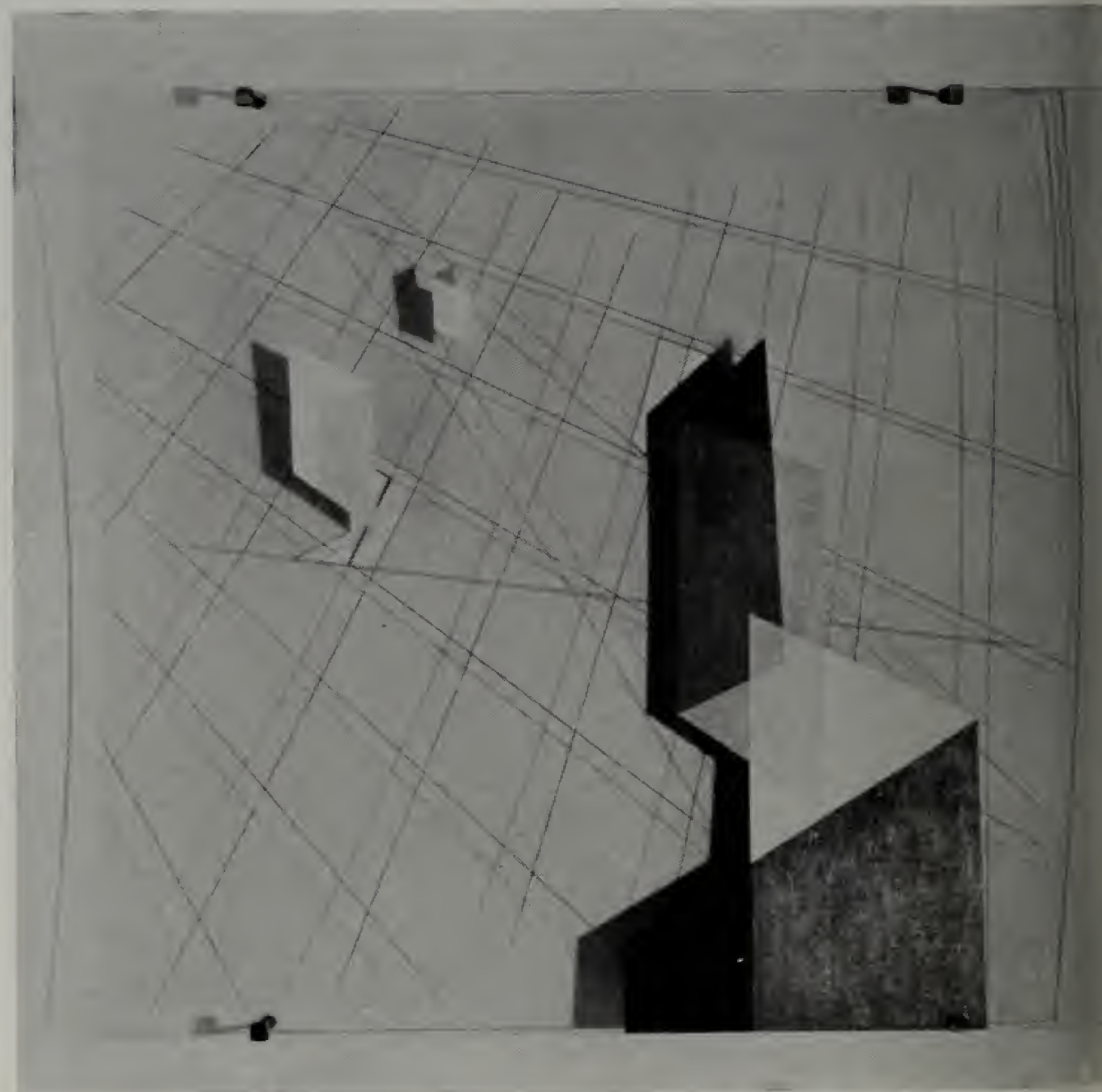


Fig. 355. Frances Picabia, 1930

Superimposition

In this painting the motion of the single figures (woman, man and cat) is recorded in a kind of graphic shorthand



Fig. 357. ● L. Moholy-Nagy, 1940

Space modulator (construction in plexi-glass on a mirroring plane)





Fig. 358 a, b, c, d, e.
Distortion diagrams for the novice pilot who has to learn the reaction of the machine to all his manoeuvrings in the air. Here again: **distortion equals motion**

Photomontage has a similar connotation. The final effect is a synopsis of actions, composed of originally unrelated space and time elements juxtaposed and fused into a unity. (Figs. 287-291, 387, 389, 390)

A cameraless picture (photogram) can also be understood as vision in motion since it is a diagram of the motion of light, creating the space-time continuum which literally is the photogram.* (Figs. 238-254, 388)

symbols

This type of analysis may help to find visual symbol values for space-time experience. Such a symbol is the spiral. It revolves from the outside to the inside with constant ascent. Inside and outside are simultaneously seen.

The smoke diagram of a skywriter-plane, the drawing or light tracks of motion studies (Figs. 4, 156, 157, 191, 327, 330), the various ways of distortion, such as the curved edge of bent plastic sheets and wire structures (Figs. 306, 312, 314-317, 320, 329, 357), transparency (Figs. 181, 189, 203, 205, 211-215, 350, 356) (light penetrates matter) and inter penetration (Figs. 216, 354, 355) have also space-time connotation.

By future research such phenomena will help to clear and shortcut communicational needs on the plane of intellectual-emotional fusion.

mobile architecture

Mobile architecture is space-time reality. Automobiles and trains can be viewed as mobile buildings. That is, should be so viewed. Unfortunately, they are still largely designed with the traditional principles of static architecture, a more or less obsolete superstructure erected upon a new type, the mobilized base. The notion of sending a "house" to sea, as in the luxury liner, is simply imposing the past upon the present.

The bare fact that in this country from 600,000 to 800,000 families live today on wheels in trailers must influence all architecture.

Among the exhibits at the 1939 World's Fair in New York was a "poetic" scene.

• *James Joyce captured this delicate quality, this becoming, in a passage of "Ulysses"; "a very short space of time through very short time of space."*

Fig. 357. Hans Finsler, 1925
Chocolate mixing machine
The moving mass of soft chocolate forms a twisted shape (distortion equals motion)



Fig. 360. Albert Renger-Patzsch, 1924
"Architecture"
Distortion achieved by using a prism in front of the lens





Fig. 361. Frank Lloyd Wright, 1937
The Kaufmann house at Bear Run, near
Pittsburgh

In its unusual conception, courageous use of reinforced concrete, this building is one of the masterpieces of contemporary architecture

In the light of the full moon the silhouette of a big building was visible. Then majestically the sun rose and suddenly a whole wing of the building moved on rails down to a trailer-truck and drove away.

Gropius and Wagner are advocating demountable, movable houses for future cities. There are projects not only of movable but of moving houses too; sanitariums, for example, turning with the sun. •

The architecture of Frank Lloyd Wright, especially the strongly cantilevered Kaufmann house at Bear Run, near Pittsburgh, shows more similarity to an airplane than to traditional buildings. To live in such a house creates the sensation of being in an airplane, giving an emotionally freer relationship to the surroundings. Such

• *The house of the future should have movable eaves which, by power, would protrude or move back according to the stand of the sun in the different seasons. This would be a new type of horizontally moving, solid awning.*

buildings may be disturbing to a few unimaginative people, who probably would be even more aghast at the plan of Professor J. D. Bernal of Cambridge, England, to construct houses whose walls are produced by compressed air, by rotating air streams or opaque gases. These walls would provide perfect insulation. Arthur Korn built a rubber factory in Berlin in 1930 where he used a pressed air curtain to prevent bad odor penetrating adjoining rooms. Such an air curtain may be used in the future as a kitchen door. •

The question then arises: why should one live between stone walls when one could live under the blue sky between green trees with all the advantages of perfect insulation?

Some contemporary buildings with their undivided, gigantic windows already allow transparency and thus the unhindered view of everchanging surroundings, since the seasonal shifts at least visually enter the rooms as in the house Gropius, Lincoln, Massachusetts. Another house designed by Richard Neutra (California) makes nature a part of the vestibule by means of a garden growing simultaneously "inside and outside" divided only by a large glass wall. A restaurant in Berlin, a cinema in Zurich and a night club—of all things—just outside of New York have movable roofs so that the starlit sky can become the ceiling. By interpenetrating nature and man-made structure, the old idea of synthesis has been at least approximated.

• *The driver's cabin in a Diesel locomotive is aerodynamically designed so that a vacuum created by the high speed around it acts as a strong insulation for the window shields against flying dirt, rain and snow.*

In 1927 in Zurich I suggested for cinema publicity to the architects Moser and Steiger a gas curtain onto which motion pictures could be projected through which the public could pass. This gaseous curtain could also, chameleon-like, change colors.

Fig. 363. Walter Gropius and Marcel Breuer, 1938

The Gropius house in Lincoln, Massachusetts

Fig. 362. Richard J. Neutra, 1941

Residence of John Nesbitt, Brentwood, California

The entrance with lily pond, continues through a glass wall into the interior, accomplishing a delightful unity of man-made structure and nature. The mirror set at 90 degrees to the transparent wall enhances the visual richness







Fig. 364. Le Corbusier, 1925

A housing unit executed as the exhibition pavilion of the magazine, "L'Esprit Nouveau", at the Paris Exposition of Decorative Arts

The conservative exposition committee, not very enthusiastic about the participation of Le Corbusier, assigned to him a site full of trees, stipulating that none could be cut down. He turned this shortcoming into a virtue, erecting his building around a tree, demonstrating the idea that architecture and nature could be more thoroughly fused



Fig. 365. O Students of the Institute of Design, Chicago, 1945

Exhibition of the faculty, "Form One" In the new exhibition techniques, virtual walls play a great role. They are often made from string, wire, and wire mesh

exposition architecture, display, theater, dance

In Paris in 1925 Le Corbusier built an exposition building for his "L'Esprit Nouveau". The trees on the site had to remain, thus he incorporated one of the largest trees into his pavilion fusing "the inside and outside" into a new unity. Frank Lloyd Wright allowed a tree to grow through the balcony of the Kaufman house at Bear Run. The greatest attraction of the Edinburgh (1938) exposition was a restaurant where guests on the second floor could sit under blooming trees which penetrated the ceiling of the first floor.

In expositions, structural and practical limitations can be dismissed more easily than in a permanent type of architecture. Indeed, starting with the London Crystal Palace, through the Paris exposition of 1889 with its Eiffel Tower, to the expositions of our day in Berlin, Paris, Moscow, Barcelona, Stockholm, Milan, Chicago, San Francisco, New York, a more or less imaginative world did come true—the embodiment of projects which were conceived by the great "dreamers" of mankind, the creative architects, artists and designers who dared to use the potentialities of the new materials of a new age. Their temporary structures can be understood more in the way of laboratory experiments than as a panorama of dissociated units. Such architectural experiments on a large scale may signalize a spatial order in which neither single structures nor large spans of openings will play the most important part, but rather the relationships of neighboring units, the harmonious and functional distribution of buildings and free spaces, the right proportion between shelter, recreation, leisure and production areas. "World Fairs" could be in the future community affairs from which the curse of trashy sensationalism will be lifted; where it will be understood that nothing more important can be done in life than search for the biologically "better ways".

Attempts toward a new type of space articulation are embedded in the most advanced solutions of the pioneering young architects in North America, Brazil, Holland, Switzerland, Finland and Sweden. They have already humanized the technological advances even though, for the time being, they work mainly for a privileged clientele.

The fact that their efforts are not as yet generally accepted and only hesitatingly employed for slum clearance and public housing is more an indictment of traditional-minded administrations, ignorant of the people's requirements, than a criticism of the new direction.

The public accepts technical processes and new inventions more readily when they affect only details of the living standard; the acceptance becomes more difficult if they seem to cause radical changes in habits. And yet many inventions, appearing at first as casual improvements for a few, paved the way to a complete transformation of everyone's life. Examples are telephone, telegraph, automobile, airplane, refrigeration and radio. They—of course—must be understood as the utilization of new materials and new potentialities, not for their technological sake but in the direction of a more functional and biological use.



Fig. 366. ○ L. Moholy-Nagy and Marcel Breuer, 1936

Model of an exhibition with offices and stage for fashion shows and cinema performances

The main requirement of an exhibition is activity flow, effective visual demonstration and easy communication

Fig. 367. MARS (Modern Architectural Research Group) Exposition in London, 1937

This detail shows a porch, synthesizing the elements of architecture and nature





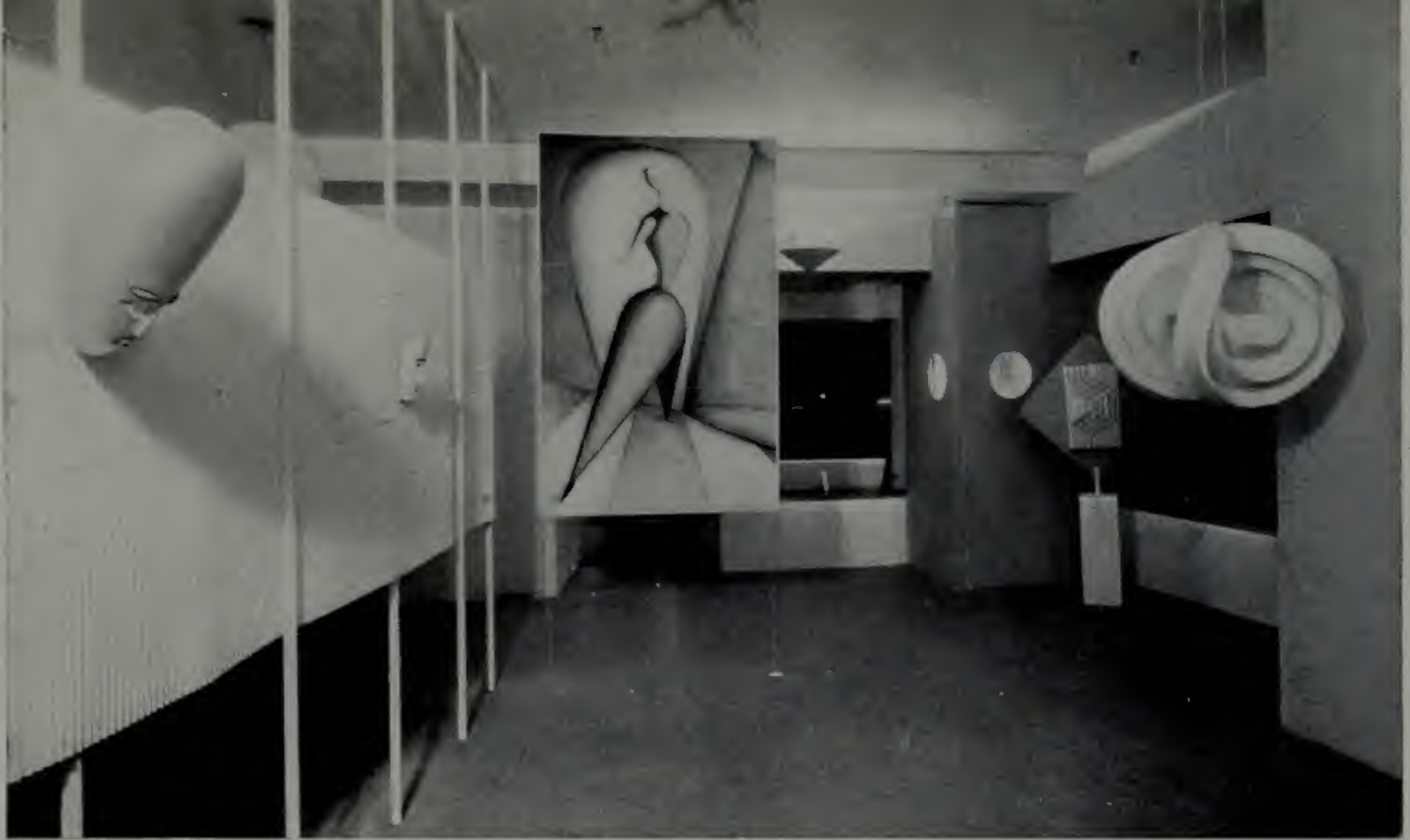


Fig. 369. Herbert Bayer, 1937
Exhibition of the Bauhaus, in the Museum of Modern Art, New York

Fig. 370. Herbert Bayer, 1945
The exhibition of the Container Corporation of America for modern advertising
The structure was designed as a knock-down solution for easy packing, transportation and assembly



Fig. 368. Aino and Alvar Aalto, 1939
The exposition pavilion of Finland at the New York World's Fair
With high, undulated and inclined walls, the Aaltos introduced the baroque richness of a monumental pipe organ into the room, a solemn framework for the manifold wood products of their country



Fig. 371. L. Mies van der Rohe, 1929
Pavilion of the German Reich of the
Worlds Fair in Barcelona, Spain
Corridor at the front composed of green
marble and crystal plate glass walls; the
ceiling was supported by chromium-plated
cross-shaped steel beams.
Marble was for a long time ruled out by
the modern architects as an element of
obsolete architecture. The same was the
case with wood. Today these materials
are reconsidered. One of the first among
modern architects to take up marble has
been Mies van der Rohe

Fig. 372. Maxwell Fry, 1937
Exhibition room for electrical appliances
The railing of the circular stairway is used
as a display case. An impressive use of
transparent material in a limited space



Fig. 373. Banfi, Belgioioso, Rogers and
Peressutti, 1934
Aeronautical exhibition in Milano
In the foreground is an early Caproni and
Gabardini seaplane



Advertising, as usual, quickly adopts new ideas. Advertisers, having no inhibitions regarding classical rules, already use light, for example, as "building material". With light, architecture itself can be changed. With light one may pull together walls and windows or break them down into small units. With neon or other lights a completely different building outline can be created overnight in place of the actual structure. In the future, light—monochrome and multicolored—will play an essential part in architecture. The plan for a science museum in Paris by Jourdain-Nelson already foreshadows the use of such elements. These will carry in their wake also the solution of the old problem of relating painting, sculpture and architecture. But only a new insight into this problem can promise a full integration of all visual expression (including television) with the structural demands.

Step by step the necessary changes are coming. But even the most modern architecture of the static type is only a transitory step toward the future architecture of kinetic character. Space-time is now the new basis on which the edifice of future thoughts and work will be built.

It would be logical to assume that these ideas, particularly the powerful developments of modern architecture, have influenced the concept of stage design. But strangely enough, neither theater nor movie settings yet show the slightest inclination toward a really new space conception, although the new ways of handling space are so full of visual excitement and emotional tension that their use would mean not only an adaptation to contemporary spirit but also box office success.

The reason for the lack of a "contemporary" stage design is that the present theater is a remnant of the renaissance—a box in which to create an illusion of reality! There is little hope for a new space concept on the stage as long as this "box"—with only the front side open—is maintained. Revolutionaries of the stage—Meyershold, Kiesler, Piscator—have been fighting for a long time for an open-space theater like an arena.

The open-space stages of Greece and the Middle Ages, on which the actors' relationship to each other and to their audience could be observed transparently, showed a foretaste of the tendencies prevailing in the space articulation of modern architecture. The new trends, originating mainly in new materials and constructions which were introduced by the industrial revolution will also bring to the theater greater flexibility. A combination of the existing mechanical devices and future light technique will make a revolution of the stage inevitable. This revolution will create the new setting for verbal articulation as well as for the dance which is space-time visualization through the human body.



Fig. 374. ○ L. Moholy-Nagy, 1928
Scene from "Madame Butterfly"

One of the most important means of expression for the stage designer is light. The traditional theater designer generally worked with dispersed light, without any shadow. But light without shadow is lifeless

In order to achieve the richest play of shadows, in all my theater work I have tried to dissolve the straight and plain surfaces into curved planes, and have used skeleton walls which cast open, not solid shadows. This "Butterfly" was designed for a stage which allowed a quick change of scenery by moving it at the end of the act to one of the side-stages (the "wings") and rolling in a new set from the other side. This facility made possible the building of a double-set, comprising the middle stage and one wing. This allowed a change of scene before the eyes of the public. During the "garden aria," for instance, while the middle stage was rolled away into the left wing the singers moved right in the garden. This created the illusion of a long walk since the set previously in the right "wing" was brought to the center

As a backdrop, a gigantic photomontage (a composite picture of Japanese landscape, with a large cutout for the bay) was used. Behind it, on the cyclorama colored lighting effects, from dawn to sunset, were projected



Fig. 375. Xanti Schawinski, 1936
Paper costumes for dancers used as kinetic "light modulators"

Fig. 376. Xanti Schawinski, 1936
Costumes for stilt-dancers

An amplification of spatial relationships the dancer produces. An anthropomorphic utilization of the "virtual volume"



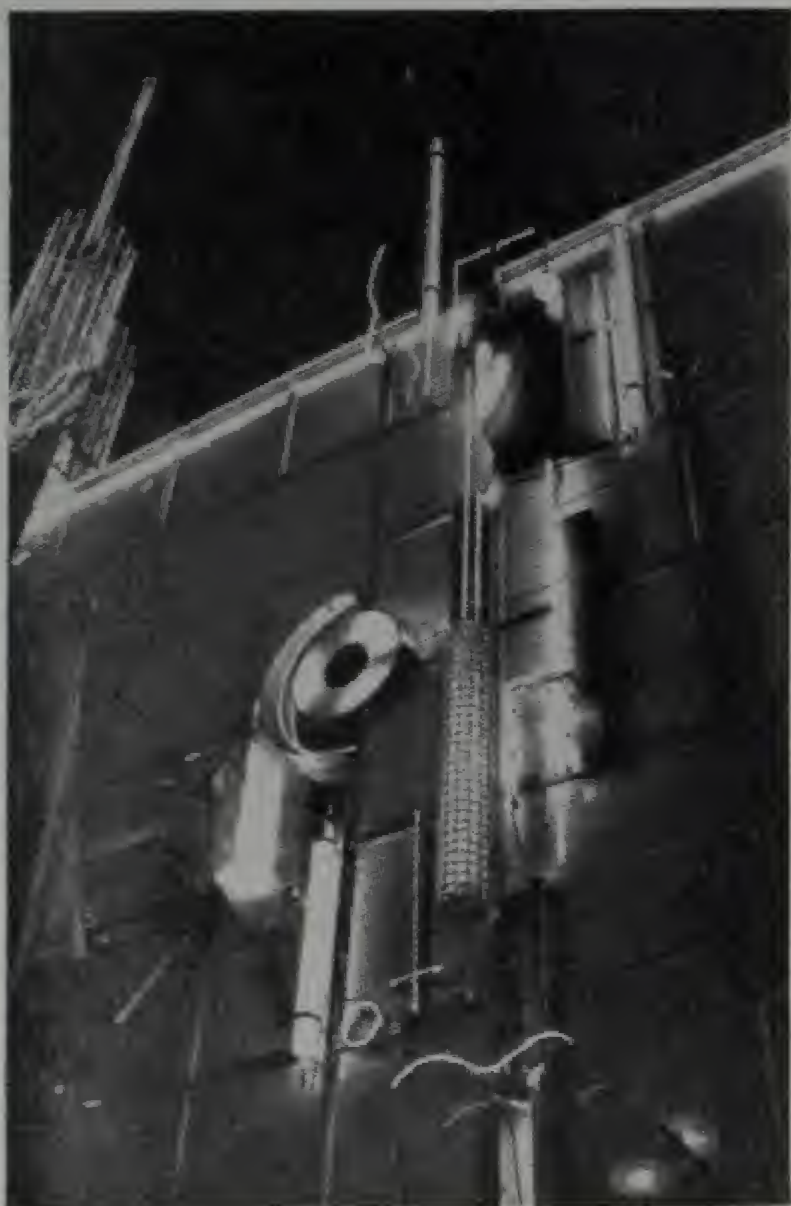


Fig. 377. Yoshio Watanabe, 1938
Ginza Palace, Tokyo
This three-dimensional light advertising forecasts a more conscious use of illumination and its space articulating quality in the future

space-time?

Since "space-time"• may be a misleading term, it especially has to be emphasized that space-time problems in the arts are not necessarily based upon Einstein's theory of relativity. •• This is not meant to discount the relevance of his theory to the arts. But artists and laymen seldom have the mathematical knowledge to visualize in scientific formulae the analogies to their own work. Einstein's terminology of "space-time" and "relativity" has been absorbed by our daily language. Whether we use the terms "space-time", "motion and speed", or "vision in motion", rightly or wrongly, they designate a new dynamic and kinetic existence freed from the static, fixed framework of the past. Space-time is not only a matter of natural science or of esthetic and emotional interest. It deeply modifies the character of social ends, even beyond the sense that pure science may lead to a better application of our resources.

History furnishes us with a good example of this. When the European cities consolidated into political and economic units and dethroned to a certain extent the regime of the feudal lords, the space concept was suddenly invaded and challenged by a new element: time. Where heretofore only space, the acreage of land owned, had basically determined economic and social values, the artisan and the merchant, the two pillars of city life, built their wealth on the time they had to put into jobs, the time they could buy from others to work for them, the time it took to bridge the distance in moving goods from the place of production to the place of consumption. Time (speed) became the most important competitive factor in production, transportation and sale. With the introduction of accelerated time, a new kinetic dimension was added to the static existence.

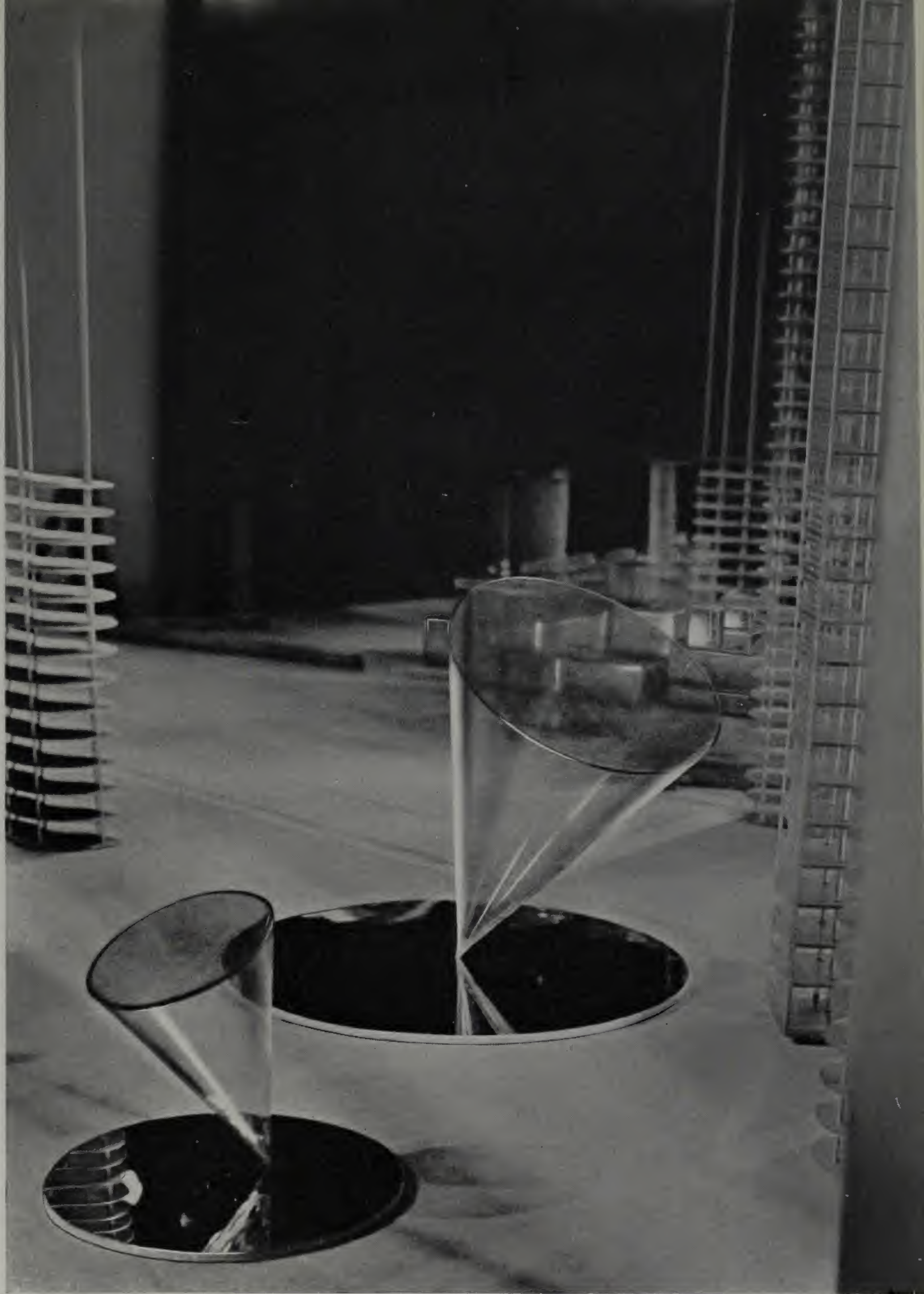
Space or space-time experience is not merely the privilege of exceptionally talented persons. It is a biological function, as important and as common as the experience of color, shape and tone. Its connotations are numerous. There is, for example, the hope that it will help in grasping future problems and vistas, enabling us to see everything in relationship, that it will furnish us with the right concept of cooperation and defense against aggression, where again space and time are inseparably intertwined. • • •

• The book by Dr. S. Giedion: "Space, Time and Architecture" (Harvard University Press, 1942) will help greatly in understanding this concept, though I am approaching the problem not so much from the point of view of architectural structure as from that of social implications.

•• The relativity theory states: The speed of light is constant; it is the absolute speed in the universe. However, motion of objects can only be measured relative to another motion. Time is a coordinate of space. It is the "fourth dimension"—a physical measurement. Electricity and gravity combined account for all solid matter and matter and energy are interchangeable terms. This latter thesis led to the forecast of Einstein that the atom can be split thereby releasing immense energies.

• • • Even the soapbox orators have already adopted the new term: "The Japanese changed Pearl Harbor from a place to a date." Another example: the submarine finds its target by radio wave sent out and reflected back, indicating distance by time. The "instantaneity" of this measurement of space with a time factor makes it totally different from the way in which one used to measure, say, the distance from New York to Chicago as "ten days".

Fig. 378. ○ L. Moholy-Nagy, 1936
Special effects for "Things to Come"
by H. G. Wells, London Film
This same set with the revolving cones,
photographed with multiplying prism, pro-
duced so rich a visual result that the edi-
tor of the film did not dare to use it



"America's greatest achievement so far has been in the field of pure 'time-problems'. 'Time is money'. America has sufficient space. The result has been a dominating appreciation of time. . . . "Europe—on the other hand—always faced the opposite problem: space. Time seemed eternal. The European architecture is a clear indication of this space-feeling. The architectural understanding you can find in Europe—the appreciation of form and space—is unknown in America. What appeals to the American in the European monuments is the historic element—time. Form means very little. What is going on in Europe at the present time—what is behind the interest for America—American production, American method is—I believe—a new understanding of time as an essential element of life. Final aim: Time—Space.

"America has only developed the 'time-faculty'. The finest intelligence has been working with time-problems. Communications. Autos. Elevators. Railways. Moving-pictures. And first of all: Production. Efficiency: time-saving" (K. Lönberg-Holm in "i 10" No. 15, Amsterdam, 1928)

It is enough to understand one example of logistics to grasp its ever growing significance. The military strategist has to estimate the kind of warfare likely to be waged in a particular area. His plans have to include the maintenance of a precise number of pieces of artillery in that particular theater of war. For that it will be necessary to organize and coordinate the production of factories and transportation means to maintain the pipeline (the normal flow of estimated need of full units) including the anticipated damage by enemy attack upon shipping, as well as to estimate normal wear and tear. Further, for these guns there is a need of special instruments which may wear out before the guns themselves. Then there is the problem of maintenance, and possible damage or loss by enemy action in actual battle; plus the varying type of ammunition required. Also, the right personnel must be available when and where needed, not only the combatants who serve the guns but also mechanics to provide necessary repair and replacement. An immense amount of detail has to be visualized. This is a vast and complex manipulation of men, raw material, clerical work, production and transportation of which the peculiar characteristic is that it is a process of constant change since the absorbed material continually has to be replaced. Though all this as a reality functions more or less perfectly, its exact rendering for the purpose of study and quick reading would entail an imagination and inventiveness yet missing. In fact, no *visual technique* exists yet which could convey to the public the complicated nature of these transactions in a simple, legible form. But this has to be found if planning for the destruction, which is war, shall yield a lesson for the planning of peace and the common good.

The more people understand and master this type of "thinking in relationships" the easier it will be to realize social planning and a better living. "Vision in motion" is a tool to render the complexity of these processes as simply as the economist attempts in his field when he speaks about all this as a matter of man hours, that is, operations measured by time. •

We are heading toward a kinetic, time-spatial existence; toward an awareness of the forces plus their relationships which define all life and of which we had no previous knowledge and for which we have as yet no exact terminology. The affirmation of all these space-time forces involves a reorientation of all our faculties.

Space-time stands for many things: relativity of motion and its measurement, integration, simultaneous grasp of the inside and outside, revelation of the structure instead of the facade. It also stands for a new vision concerning materials, energies, tensions, and their social implications.

This conception is still unpredictable in its consequences for the improvement of the affairs of mankind though the artist as well as the designer already experi-

• Jack Pritchard (London) indicated the use of the "man-hour" as an effective "rendering" of this type of logistic planning.

In order to read multi-relationships simultaneously, scientists use nomographs. A nomograph is a diagram of scientific or mathematical laws which are expressed by equations with any number of variables.

In a nomograph the lines or curves are so arranged that any straight line drawn across the diagram intersects the lines or curves at points which satisfy the equation for which the diagram was made.

A true nomograph must be read by means of a straight edge, a compass, two sides of a triangle, or any conceivable curve or line which serves as the key to the diagram. F. T. Mavis, in "The Construction of Nomographic Charts", calls the nomograph "a grapho-mechanical computing device."

The nomograph makes it possible to read simply, rapidly and accurately in one diagram any number of variables which would otherwise have to be expressed by many graphs.

The nomograph is also called an alignment chart or a nomogram.

The main principles of nomography were developed by Philbert M. d'Ocagne in France about 1890. D'Ocagne was the first to use the terms "nomography" and "nomogram".

ment with it on a new level of consciousness. The designer has to think in terms of integrated processes of materials and production, sales, distribution, financing and advertising; the contemporary artist consciously or intuitively tries to express the substance of his specialized field as the result of forces in space and time and to integrate it with the social reality. He prepares a new and creative vision for the masses, and with it a new orientation for a healthier life plan. But in order to benefit society, the artist's work must penetrate everyone's daily existence.

As a reminder of the atomic age, here is the model of the chemical structure of a material.

Fig. 378a. Power puzzle

This is a chemist's model of the hydrogen and carbon atoms in one type of hydrocarbon molecule. Gasoline is a mixture of hundreds of different kinds of hydrocarbons—each with its own molecular structure and each with its own special way of behaving inside a gasoline engine

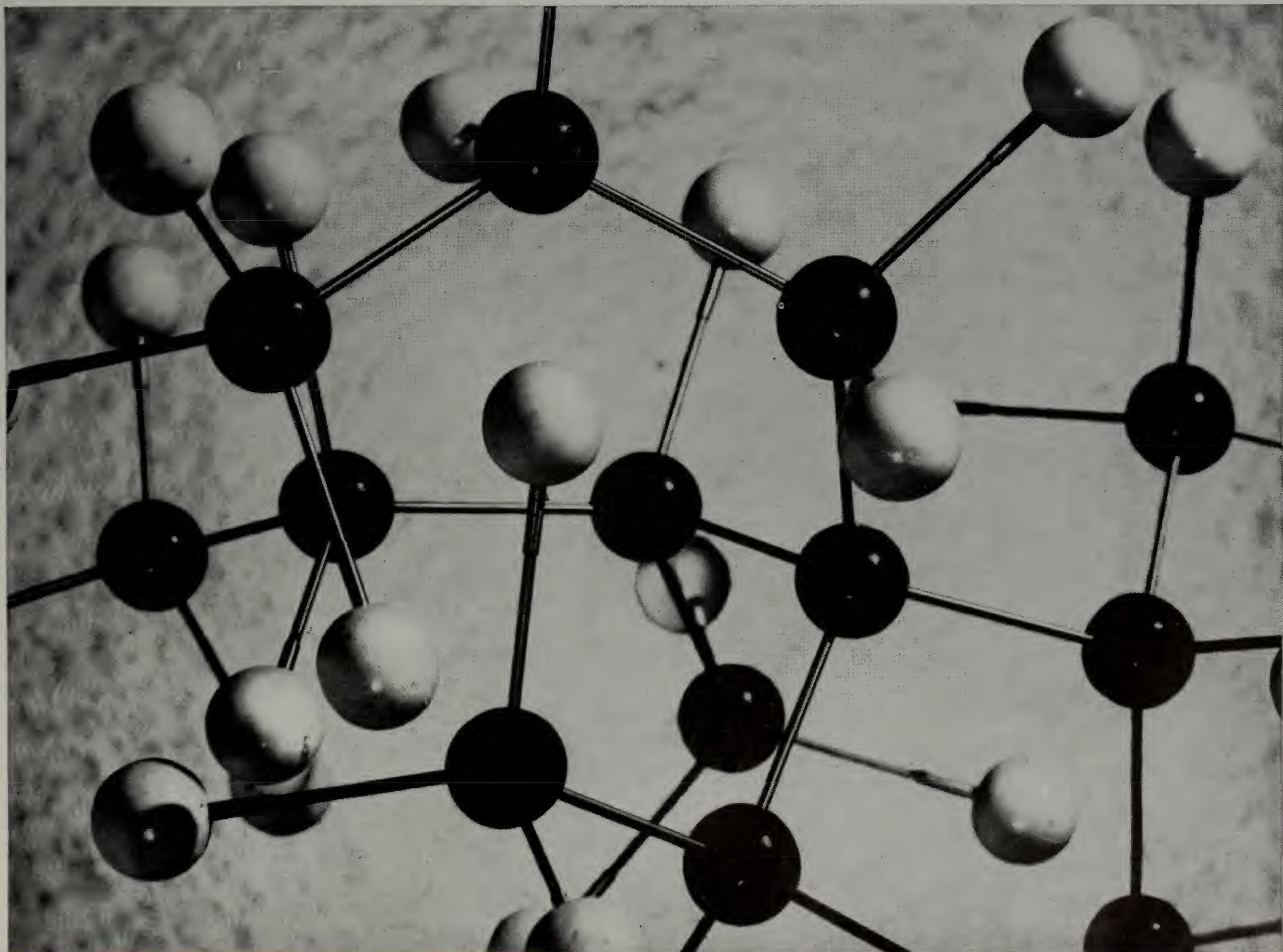


Fig. 379. Kasimir Malevich, 1917

Suprematist drawing

The suprematists and the constructivists can be understood as investigating the elements of motion which achieves its greatest visual importance in the animated cartoons of the motion picture





Fig. 380. Viking Eggeling, 1920
Synopsis of the film, "Diagonal Symphony"
Eggeling was the first abstract artist interested in the motion picture as a medium of artistic expression. He is the great pioneer of the animated cartoon

Amongst the media thus far developed, motion pictures could fulfill more powerfully than any other the requirement of a space-time accentuated visual art. Viking Eggeling, the Swedish painter, recognized around 1919, the inherent emotional power of articulated motion without naturalistic rendering or even theme-like connotations. The Mickey Mouse and Popeye films, the "animated" cartoons, are well liked by the public because of their popular stories; but only a small group of connoisseurs know that their technique was developed by experimental trail blazers, by the abstract cartoons of Eggeling, Richter and Ruttman.

the situation

Any artistic creation must involve a consideration of the specific potentialities of its medium if it is to achieve an intrinsic, "organic" quality. In spite of this law, the film today is still governed by the antiquated esthetics of easel painting and the stage of the renaissance. There is little in the current practice of official film production to show that the essential means of the film is *light*, not pigment. Moreover, the film generally is confined to the projection of a sequence of "stills" on a screen, instead of utilizing the unique possibilities of a mobile spatial projection. The same conservative attitude is found in the use of the acoustically-amplified film, the talkie, in which the old dialogue of the theater is meticulously copied.

the problem

In order to grasp the problem of motion pictures in their complexity, it is necessary to examine the most important components of the film:

- the optical (vision)
- the acoustic (sound)
- the kinetic (motion)

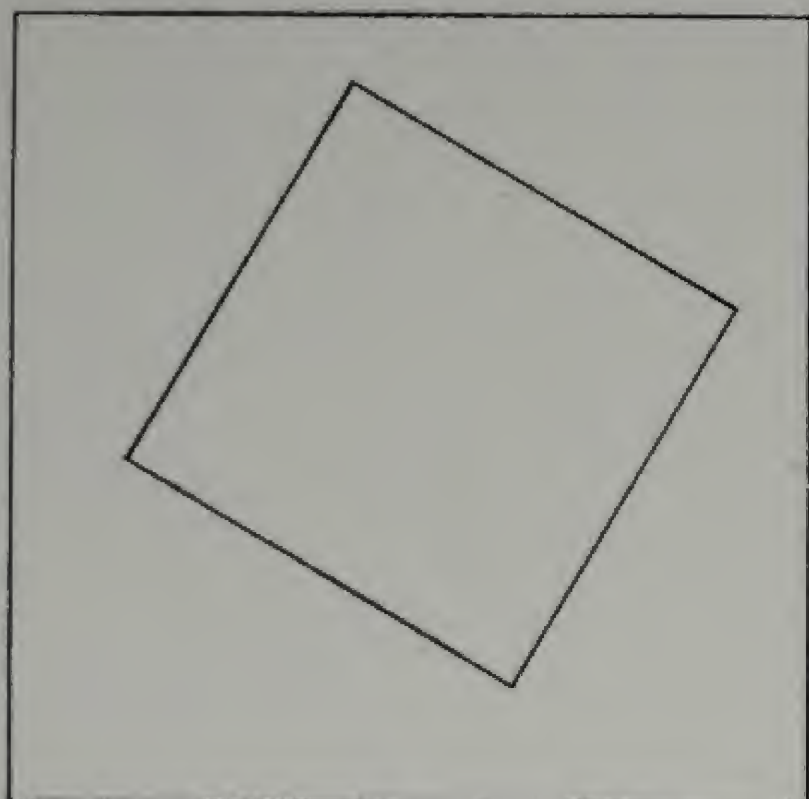


Fig. 380a. Kasimir Malevich, 1919
White on white

In 1932 I wrote "An open letter" to the film industry, published in "Sight and Sound" Vol. 3 No. 10, 1932, the official magazine of the British Film Institute. Because the main burden of its arguments seem to be still valid today, it is reprinted here:

I.

"Shall we look on while the film, this wonderful instrument, is being destroyed before our eyes by stupidity and dull-witted amateurism?"

The unbiased observer cannot fail to see, to his great distress, that the film production of the world is growing more and more trivial every year. To the trained eye and mind the present-day film can give no pleasure.

This criticism is not confined to the artistic side of film-making. The whole film industry is in danger. This is shown by its increasing incapacity to produce a sound financial return. Gigantic sums are swallowed up by desperate experiments, extravagance in superficial matters not strictly proper to the film; monster decorations, piling up of stars, paying huge salaries to secure

the visual

Painting, photography, film and television are parts of one single problem although their techniques may be entirely different. They belong to the same realm; that is, to visual expression, where cross-fertilizations are possible.

The development of the suprematist painter, Malevich, may serve as an example for this process of cross-fertilization. • His last picture showed a white square on a white canvas which is clearly symbolic of the film screen. While it has its significance as a painting, it is extremely revealing as a symbol of the transition from painting in terms of pigment to painting in terms of light. The white surface served as a "theoretical" screen for direct projection of light, that is, light in motion, a space-time reality. It anticipated the new outlook. It might be regarded as intuitive victory over the misguided efforts of the present-day film which imitates more or less successfully the pictorial composition of the old easel painting, its monocular vision and its picturesque settings.

Suprematism has superseded manual craftsmanship in painting, although easel painting, as an exclusively manual craft, may continue to exist for some decades to come, retained for pedagogic reasons and as a means of preparing the way for a new culture of color and light. But this preparatory phase can well be shortened if the problems of visual needs are correctly postulated and systematic optical research organized. The motion picture can play its role by making a start, taking the new medium and its specific possibilities as the basis of departure. Its indispensable elements will be the controlled solar light effects of the spectrum, artificial lights of variable intensity, reflectors, projectors, instruments for polarization, interference and refraction of light as well as a new chemistry of emulsion, developing and printing. The successful accomplishment of photography in total darkness by means of infrared rays is already a great advancement. Technicolor 35 mm and kodachrome 16 mm films are producing direct color continuity. American, French and Russian experiments with three-dimensional films give promise of interesting developments in the stereoscopic sphere. But these advances mean only the improvement of the technical tools. The impact of the new film on the public has to come from a new "content" adequate to the advanced tools used for its realization.

light

Film production must stop being imitative. The ambition must no longer be to transform papier-mache into forests or spotlights into sunshine. Light must be used according to its basic characteristic and the film architect will have to conform to its new orientation. The film stage of the future will be conceived as a structure for the production of motion, light and shadow effects either with skeleton constructions or walls, planes, surfaces and textures for absorption and reflection, for the organized

• *Suprematism is a Russian type of abstract painting which has been evolved by Kasimir Malevich. In his words "Suprematism is the supremacy of the pure feeling in the plastic arts."*

performers who turn out unsuitable for filming. This expenditure will never bring in its return, so that the film is slipping back with increasing certainty into the hands of the adventurers, from whom it had been rescued after its initial period of being a purely speculative business.

II.

The root of all evil is the exclusion of the experimental creator, of the free independent producer.

III.

Yesterday there were still crowds of pioneers in all countries; today the whole field is made a desert, mown bare. But art can know no further development without the artist, and art requires full sovereignty over the means to be employed.

Every work of art attains its achievement only through the responsible activity of the artist, driven to his objective by his vision of the whole. This is true of architecture, of painting, of drama. It is equally true of the film.

IV.

From the nature of the film arises the difficulty of experimentation, the nursery-garden of good film work; for to the film there is attached a machinery of production and distribution, the organization of which stretches from the scenario through acting, photography, sound recording, direction, and film cutting up to press propaganda, distribution and theater. Only thus could what was once a side-show at a fair be converted into a world-wide business.

Amongst the economic complications of this enormous machine the artistic aspect is treated so incidentally, judged so entirely from the mercantile standpoint, that the significance of the creative artist of the film is completely eliminated. One might almost say that the director is forced through fear of penalties to do without the cinematographic art. By becoming part of the prevailing system of production, even the best pioneers have, to the bitter disappointment of all those interested in films, sunk to the level of the average director.

The independent producers were an embarrassment to the industry. The existence of the pioneers implied a destruc-

distribution of light. Such a scenic concept—not “background”—will be a tool for vision in motion rather than a setting for sentimental naturalism.

abstract film

Like all other means of expression, the film with its characteristic visual, perceptual elements appeals directly to the senses. This is the basic departure of abstract motion pictures. The development of this category of film will increase in importance if the means are found to consciously control the “photocreative” conditions necessary for its appeal. The same is true of the direct psychophysical response to color without any naturalistic theme. It is safe to predict for the film an increasing use of pure colors as in non-objective paintings. The recognition of this trend and its possibilities is essential if we are to find a healthy escape from the present deluge of trashy colored motion pictures.

Cameraless photography, the “photogram” is the key to an improved performance of film art. “Light texture”, the wide scale of gray between the black and white poles and the wide range of color values in the color film are of profound significance for abstract experiments. In addition, investigation of the superimposition of different images and of other photographic manipulations, including the optical printing machines and the different systems of color organs, have to be undertaken.

Abstract visual effects and investigation of the form of light morphosis are not, however, the sole problem of the film. Problems of motion and sound demand new solutions of equal magnitude. Nor is that all. Other aspects of the film are its documentary and educational functions. In these fields, the film is generally superior to the manual performance of the painter.

documentary film

In our epoch of political and economical struggle, the film as a record of facts, as reportage, has become an educational and propaganda medium of first importance. In pre-Hitler Germany, progressive educational films were made by commercial film companies as well as by amateurs like Victor Albrecht Blum, Sven Noelde and myself. England's General Post Office, under the direction of John Grierson, produced excellent documentary films by Cavalcanti, Rotha, Jennings and a group of other enthusiastic young men. The Russians Vertov, Turin, Dovzenkho, the Dutch Joris Ivens with John Ferno, the Americans Pare Lorentz, Paul Strand and other film directors, enlarged the scope of documentary films in social reportage and planning.

pioneers

All types of films—but especially the abstract ones—need an *avant-garde*, as in the days of the silent film, a group of experimental film producers not working for profit—men like Picabia, René Clair, Fernand Léger, Count Beaumont, Man Ray, Bunuel, Dali, Cocteau and others. Their attempts were directed mainly toward the potentialities

tive criticism of official production. The vitality of the small workers, their faith in the cinematographic art, while hardly moving mountains, did box the ears of the industry soundly. It swung out for a counter-blow without realizing the soundness of these pioneer movements, their efforts to press forward on the artistic side. So the industry carefully stamped out anything which was even suggestive of pioneer effort. Their crowning victory was found in the necessity of specially constructed studios for sound-film production and theaters for showing, and consequently the final business monopolization of the 'art of the film'.

V.

The way was freed once more for mechanized business. The industry was victorious all along the line.

Everything contributed to help them; legislative regulations concerning quotas and import restrictions, censorship, distribution, theater owners and short-sighted critics. But the victory of the industry has been a costly one. Art was to be destroyed in the interests of business, but the boomerang has whizzed back and struck the business side. People do not go to boring films, in spite of the calculation of returns made by the film magnate on the theory that every adult must visit the cinema twice weekly at an average price of so many cents, pennies, pfennigs or sous, per ticket.

VI.

Shall the artist now, after all the kicks he has received, turn round and help business? Shall he take a hand again and beg with economic arguments for the weapons of the spirit that were struck from his hands?

VII.

Good, we will do so.

Now we start estimating profits.

VIII.

The culture of the film grew with the onlooker. History records no similar process of general passive participation, extending to all nations and continents, in any art which could be compared with the cinema. Through the quantitatively enormous part played by attendance at cinemas, even the most

in the vast arsenal of the motion pictures without literary or commercial compromise. Unfortunately the sound film increased the expense of film production so much that amateur work today is simply stamped out. However, this need not be. The amateur who is not fazed by the Hollywood facade and its gargantuan apparatus, could perform miracles by just being sincere and bold.



Fig. 381. Bunuel and Dali, 1925

A scene from "The andalusian dog"

This film, though somewhat dated today, was one of the great milestones of the avant garde efforts to create a genuine motion picture art

This illustration is one of the grotesque scenes from the film: a young man frightens a girl. He pulls with terrific effort a great weight. First, one sees two ropes jerking, then slowly there appears what is being hauled along: two grand pianos on which two dead asses are lying. Finally, into view come two monks, who are being dragged along behind the pianos

primitive member of the audience is in a position to exercise criticism of the film and register the slackening of creative performance. This means the necessity of straining every nerve in creative work. But where is that work to come from, if the artist is to be excluded from the creative process?

IX.

A pioneer group is thus not only an artistic but an economic necessity.

X.

All barriers against pioneer efforts must be removed. Encouragement, private, industrial and official, must be extended to the independent cinema artist.

XI.

This means that we demand for him:

- (1) *from the state*
 - a) *removal of censorship restrictions*
 - b) *no taxation on his creations*
 - c) *payment of allowances;*
- (2) *from the industry, in accordance with output:*
 - a) *studio*
 - b) *sound*
 - c) *material*
 - d) *obligatory performances by distributors and theaters;*
- (3) *education in artistic film work to begin long before the practical side. The antiquated art school curriculum must be replaced by the establishment of*
 - a) *studios for lighting (artificial light)*
 - b) *photo and film studios (camera technique)*
 - c) *dramatic classes*
 - d) *theoretical, physical and experimental departments.*

XII.

Formulating and fighting for these demands is terribly necessary at the present time, for our generation is beginning to waste the magnificent technical heritage of the past century. It remains to be hoped that these statements of opinion will remind a few people, at least, of the intellectual problems which the conscience of the thinking man bids him solve."

Fig. 382. Jean Cocteau, 1930

A scene from "Le sang d'un poete" (The blood of a poet)



sound film

The sound film is one of the most important inventions of our time capable of enlarging not merely visual and acoustic possibilities but also social consciousness. But the new sound film has been little more than a reproduction of dramatic dialogue and sound sequences, its sole function being to provide a documentary record of a visual and acoustic reality. Only the interrelated use of both sight and sound as mutually interdependent components of a purposeful entity can result in a qualitative enrichment or lead to an entirely new vehicle of expression. Sound scarcely enriches the scope of a film if it is confined to underlining or emphasizing the visual part, already complete in itself. We must refine and expand our acoustic receptivity if we want to make real progress. The sound film ought to enrich our acoustic experience by giving us new auditory values, just as the silent film has already begun to enrich our vision. But contemporary composers of music have so far barely attempted to develop the potential resources of the phonograph record, let alone the radio and other electronic devices. They have to remold their work to conform with these developments.

The talking film need not embody an uninterrupted sound sequence. The acoustic impression can be doubled in intensity if sound is arranged in phrases of varying



length, commencing or ceasing abruptly. In the same way as it is possible to arrest an object visually and see it from above or below, profile or full face, in normal perspective or foreshortened, similar possibilities exist in regard to sound. There must be different sound angles, just as there are angles of sight, variously graded combinations of music, speech and noise. The new throat microphone will be one of the basic tools to realize such effects. In addition there are numerous possibilities for acoustic close-ups, slow motion (the slowing down of sound), acceleration (sound contraction), distortion, duplication and other manipulations in sound cutting. Optical simultaneity must find its counterpart in the realm of acoustics. It must be possible, for example, to amplify the flow of music or speech with simultaneous sound "textures" or to interrupt the original line by other sound patterns; to slow down, mix, distort or contract. Acceleration or retarding of normal sequences can produce extraordinary mutations of the individual sound characteristics into higher or lower octaves. Such distortions can be combined for comic effects.

To develop creative possibilities of the sound film, the acoustic alphabet of sound writing will have to be mastered; in other words, we must learn to write acoustic sequences on the sound track without having to record real sound. • The sound film composer must be able to compose music from a counterpoint of unheard or even nonexistent sound values, merely by means of opto-acoustic notation. The synthetic sound scripts by Humphries, Pfenniger, Avramov, Janovski, Vojnov, Scolpo are the most important projects so far realized. Other suggestions for sound tricks have been used in Harold Lloyd and Walt Disney films; e.g., acceleration of speech and reversed sound sequences to underline comic situations. But the idea has not yet been employed on a broad scale in commercial film production.

The first sound film worthy of the name will be made by the artist who succeeds in discovering new types of acoustic expression which are convincingly appropriate both to the objects and the events, selected for the composition because of their relationships to one another.

Figs. 383-384. R. Pfenniger, 1930

"Handmade" music

By drawing sound curves and photographing them on a film, visual signs can be translated into acoustic phenomena. With this method new possibilities have been opened for the production of new types of sounds not existing in any of the known instruments. Also, there is the possibility of performing a composer's work without arbitrary interpretation by a conductor



• In "De Styl" July, 1922 and "Der Sturm" November 1922, I published articles about the possibility of synthetic music production through records and films. I suggested sound tracks as original compositions made by hand or machine without reproducing any existing music. In the book "Malerei, Photographie, Film" in 1925, I propounded the idea again. In an experiment, "The Sound ABC," I used all types of signs, symbols, even the letters of the alphabet, and my own finger prints. Each visual pattern on the sound track produced a sound which had the character of whistling and other noises. I had especially good results with profiles of persons. Similar experiments were also made by Fishinger Brothers in Berlin and Pfenniger in Munich who used exact geometrical shapes on the sound track. To Pfenniger go the laurels for subsequent thorough research concerning an exact notation system. In the thirties he made his first motion pictures with synthetic sound tracks drawn by hand. One featured Haendel's "Largo."

A quick application of the synthetic "talkie" was made by a British film company which had produced a comedy. At the first showing it turned out that the name of one of the less favorable characters was by chance that of one of the oldest aristocratic families. They threatened to bring a damage suit against the company. The film was quickly withdrawn and the sound track retouched by erasing the apprehended name and "writing" by hand a new one where the sacrosanct name had been mentioned.

film cutting (montage)

While in photography not the camera but the light sensitive emulsion is the key to genuine work, in the motion pictures not the emulsion, but the possibility to produce motion is the key to film production. And yet there is no theory for the use and control of motion. In the majority of films, motion is still so primitively handled that even its basic principles remain to be evolved. Practical experience has been confined to a few decades and the eyes apparently are as yet untrained to receive sequences in simultaneous motion. In the majority of cases the multiplicity of movements, even if well controlled, still convey the impression of chaos rather than organic unity.

Motion pictures are the assemblage of numerous shots. A film scene is spliced, glued together from different parts. This is called film "cutting" (montage). Any film sequence may serve as an example. For instance:

1. *A person enters Rockefeller Center*
2. *He speaks to an audience*
3. *A hand throws a bottle (close up)*
4. *Bottle flies through the air and misses speaker (long shot)*
5. *Hand slaps face (close up)*
6. *Fist pounds face (close up)*

This scene suggests that a person goes to the Rockefeller Center and while speaking to an audience there is attacked by a man throwing a bottle. This man is then slapped and beaten.

The peculiarity of this particular film scene is that all the six shots belonging to it might have been photographed at several places, in New York, Chicago, San Francisco, some even in Europe. In spite of that, the power of assemblage, the quick fluidity of the action structure logically report this incident and create out of the scene a coherent space-time reality which never existed. It takes considerable time to grasp this miracle of illusion although it exemplifies the most normal of all possible film cuts. In fact everyone experiences it daily in the cinema. It produces a straight, logical narrative of a straight, logical "one dimensional" series of events and by it the beginning of a new philosophy of potent but previously hidden relationships.

There are other types of film-cuts, more complex, showing movements on different levels; e.g., train A is moving from the station and meets train B slowly moving from the opposite direction. Through the window of train A one is watching train B moving away and when occasionally the windows of the two passing trains are in direct line, one can glimpse beyond a street with cars and pedestrians moving in different directions. Although this film may have been shot "straight" and not even a single splicing made in it, we have here a record of a "more dimensional" event. And if we would cut between the single scenes close-ups of faces and fragments, a girl with a veil, running policemen, watches, precious stones, pistols, speeding wheels, one could quickly associate these things with a detective story of stolen diamonds, escape and manhunt. This would demonstrate a *dramatic, associative* cut of the type which Hollywood often employs to create tension.

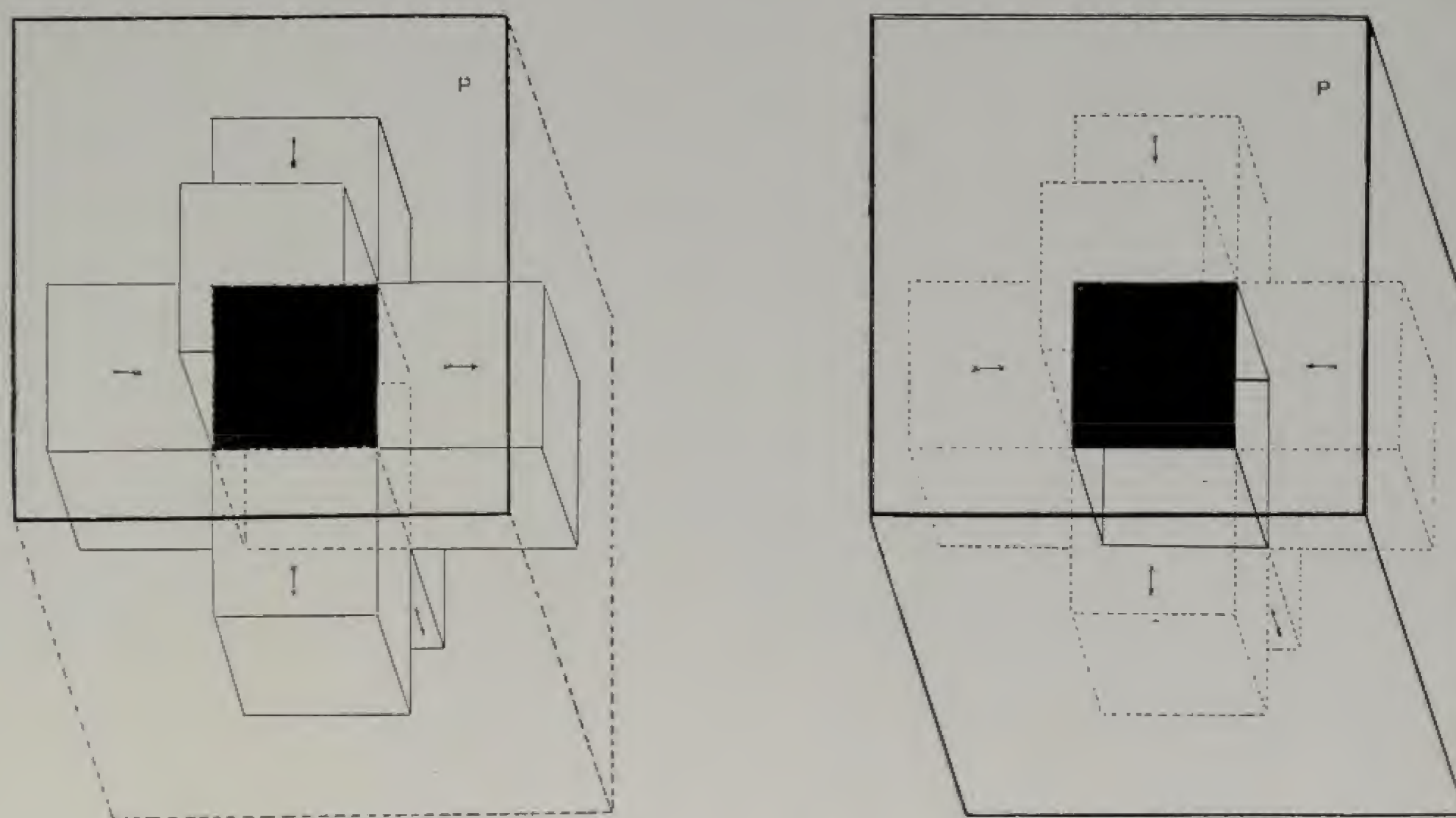
The Russians were particularly successful in evoking associative connotations. Instead of merely cutting the film in a one-dimensional linear content flow, they created strong links between individual situations and the whole film by rapid cutting of spatially and temporally different shots. They also used the associative cut *lyrically* by introducing seasonal symbols, showing spring, summer, fall and winter; rivers packed with ice, stormy clouds, thunderous sea waves. Pudovkin was especially skillful with this type of *symbolic* cut. In sustaining the tension of the drama, for example, he used the close-up of a dizzily whirling, tiny cogwheel of a broken clock—as a visual metaphor—to express the wild temper of his hero ("Mother"). In another film "End of St. Petersburg" he photographed the rapidly changing light and shadow on the face of a mean but successful factory employee rising (in a fast moving elevator) to directorship. Thus he visualized two layers of experience, (1) the rise to an elevated position (2) the grotesque psychological contrast of ruling and cringing expressed by the distortion of the face through the quick change of the black and white pattern produced by the grillwork of the elevator.

Film cuts can be conceived in numerous ways within the *perceptual*, *conceptual* and *emotional* realm. Today they obviously tend toward "more dimensional" solutions which must be developed further to conquer psychological and physical space-time.

The montage of the future must consider not so much striking visual details but rather the totality of the film, its perceptual message, light, space, motion and sound interrelations. Eisenstein's "Potemkin", Vertov's "The Camera Eye" (the Man with the Movie Camera), Turin's "Turksib" (Russia), Griffith's "Birth of a Nation", "The Plow Which Broke the Plains" and "The River", both by Pare Lorentz (U.S.A.) have already made concrete advances in this direction.

Figs. 385 a, b.. Theo van Doesburg, 1929
Diagram of a three-dimensional space projection

Left centric, right peripheric movement. The black field represents the projection screen used so far. The diagram show the screen "shaken" (extended) simultaneously in all directions. Doesburg called this the new crystalloid filmcontinuum



One of the most remarkable film-cuts was made by the Russian director, Dziga Vertov, in his film, "The Camera Eye." There the interchangeability of persons and events, the stretching and condensing of space and time, were demonstrated with spectacular skill. The scene showed a group of film men arriving at a railway station. They mount a troika harnessed with three racing horses and depart. They are photographed from a motorcar which runs beside the troika. This car is photographed from another auto which drives parallel to the galloping horses. The auto is seen then from the troika and again from the other auto. The negative of this film is then seen in a film printing laboratory where the positive print, made from the negative, runs through the fingers of the editor, and again through the editing machine. After this another scene shows a theater with the audience looking at a large screen on which the troika scene is being projected. Among the spectators are the travellers themselves. They see themselves on the screen racing in the two autos and in the troika with the galloping horses. It can be assumed that Vertov and his associates saw the whole film in an *actual* theater performance—increasing the degree of interchangeability of space and time. •

In spite of the simplicity of this event it reveals a new exciting space, time and motion articulation. The back and forth shooting of the racing vehicles; the transition of reality to the celluloid strip, first into a negative, then the negative into the positive; then the transfer of this strip to the projection screen which does not show the original shots, only an illusion, that is, the illusion of the illusion. The combination of all these elements in their astonishing interchangeability revolutionizes the customary visual as well as conceptual process. It produces a completely new timing of perception based upon the translation of physical motion into pictorial motion also the translation of the initial action into an objectively observable process viewed by the acting persons themselves. Though this may appear at first bewildering, one must acknowledge that a new code of space-time perception is in the making.

With the film cutting (especially if one day sound montage will also adopt the same inventiveness), the motion picture has found its form and substance, independent of the renaissance theater.

genuine technique for the sound film

The receptive capacity of the human ear is far less rapid than that of the eye. This physiological fact alone prescribes a distinct technique for the sound film. The right principles of work may take it far beyond the best achievements of its silent forerunner.

Because of the inertia of the ear, the sound film is forced to use shots of greater length. Thus, if a given scene consists of five separate shots in a silent picture, the sound film probably would not use more than two or three shots for the same scene.

• That Vertov did not shoot this scene in its possible perpetual succession is a mark of his subtlety.

This is the main cause of the optical dullness of most sound films. And yet there is no inherent reason why the necessity for a slower acoustic rhythm should lead to dullness in the visual sphere. The silent film, in order to give a precise three-dimensional rendering of objects, combined, by splicing together short shots, views from different angles and positions—from the front, side, back and above. The method was similar to that of cubism with the exception that the simultaneity of views which cubism achieved by superimposition of single “shots” was exchanged in the film for a succession of views in time. A few directors of current pictures have instinctively employed a smoother method of taking shots for the three-dimensional definition of the scenes, namely shooting with a mobile camera—a camera mounted on a crane, able to move at will diagonally, horizontally, vertically, in a circle or in a combination of these directions—vision in motion. With such a travelling camera it is possible to take continuous shots of any given scene from innumerable angles and constantly changing points of view ranging from long shots to close ups. This secures a fluid solution of three-dimensional rendering and illustrates the point that pictorial dullness is not a necessary sequel to the unavoidable slowness of the sound film.

Instead of moving the camera, it is possible to move the object itself on a revolving stage, escalator or conveyor belt. In addition it is possible to move the object *and* the camera. Both may move at the same speed and in the same direction, or at varying speeds and in different directions, providing the possibility for an infinite number of variations. Shots from a swing, merry-go-round, moving ship and airplane may enrich the field even more. At present, a certain complication still exists, that is, the difficulty of sharply focussing the near and the far with a moving camera. The human eye can automatically focus upon objects even if in motion. The cameraman of the future—most probably—will have at his disposal optical systems similar to the eye, “rubber lenses”—which will automatically hold the visual definition at pin point sharpness as the camera approaches, moves away from, or encircles the object, whether it be a whole scene in long-shot or a fragment in close-up. (The whole problem could be solved by employing a photo-electric cell to focus automatically.)

color film and long-shot montage

The slower rhythm of sound film montage is an advantage from a physiological point of view since it tires the eye far less than the staccato cutting of the silent film. That does not mean that the old “machinegun-cut” will be entirely abandoned in the future. It will be retained as one method among many others available to the film cutter, but rapid cutting will no longer be the cutting principle par excellence as in the early Russian films. The same considerations apply with even greater force to the color film. If the montage rhythm of the silent film to that of the sound film has a ratio five to three, the ratio of silent to color montage is five to two. In other words, the color film will use an even slower rhythm than the present black and white sound film since rapid motion produces greater visual uneasiness and more pronounced flickering in color. An exception can be made by careful color composition, introduced for quick visual grasp of short scenes.

the visual axis

Color brings the film director, editor and cutter face to face with many problems, since up to the present time we have had but few opportunities for experiencing the kinetic potentialities of color. While dynamic cutting in black-white-gray values was relatively easy, cutting in color entails far greater responsibilities. Apart from the fact that color in itself gives greater emotional emphasis to every single scene, it is necessary to articulate it in its psychophysical effectiveness by introducing a definite link for all successive parts of a color film. *Overlaps* (superimpositions) for example, facilitate the smooth transition from one scene to another without visual shock.[•] There must also be a consciously planned sequence of certain colors—red, yellow, blue, etc.—in relation to each other. Such a relation can be called the “visual axis.” It would, however, be disastrous if this visual axis were to be sought for in the “gallery tone,” the yellow-brown varnish coating of old paintings or in any single color filter tinge. Anyone versed in the technique of the painter will readily understand the problem raised here. The postulate of a single predominant color value, implied in the conception of a visual axis, does not mean that a one-filter tinge should be used in every color shot. There is a definite temptation for the technician to submerge all color values in a monochrome filtering, drawn like a veil over the whole image, because such a “tinge” acts as an automatic, though boresome, “harmonizing” agent. A real visual axis is built upon color contrasts and merely indicates a predominating color or color combination. This could be easily achieved if the idea of the “light box” (pp. 172, 173, 198-200) would be accepted also by the producers of motion pictures.

The principle of a visual axis can be and has been already applied in black and white films, as for instance in “The Passion of Joan of Arc,” by the consistent use of long focal lenses, or by the use of soft focussing devices as in “Vampire,” both pictures directed by Carl Theodor Dreyer and excellently photographed by Maté.^{••} In “La Petite Lily,” Cavalcanti superimposed rough canvas screening which was used all over the film as a pseudo visual axis, as a “texture tinge.”

color economy

A common belief of the professional as well as the layman is that color films must exaggerate color. Exactly the opposite should be the case. Films overcharged with color look cheap and overdone. The secret of a good color film is the subtle mixture

[•] *The shock involved in quick succession of disparate scenes—both psychological and physiological—can be eliminated by a number of montage techniques. One of the best is the overlap which tends to reduce the shock involved in juxtaposition of two opposing emotions; or the shock of disjointed color change which is a basic physiological reaction. In the technique of fading-out the last scene and “equally” fading-in the next in the “overlap,” the unit value of color intensity is maintained at one level throughout the change. If the overlap is sixteen frames long the fade-out has sixteen diminishing and the fade-in sixteen increasing values.*

^{••} *At the Institute of Design, experiments in color motion pictures showed surprising psychological effects of shots with the 4" lens.*

of color with "colored" blacks and grays. Surprise and permanent emotional interest will be secured by the *economical* use of primary colors. A convincing color film would be based upon white alone with occasional flashes of primary colors.

projection

Projection itself is still an unsolved problem. The rectangular screen of our cinema theaters is nothing more than a substitute for easel or flat mural painting. Our conception of space and of the relations of space and light are still absurdly primitive, being restricted to the everyday phenomenon of light rays entering a room through an aperture. It would already be possible to enrich our spatial experience by projecting light on semitransparent screens, planes, nets, trellis-work, suspended behind each other.[•] It is also possible to replace the present single flat screen by concave or convex sections of differing sizes and shapes which would produce innumerable patterns by continually changing positions like the facets of a prism in motion. Different films could be projected simultaneously on the walls of the cinema^{••} and astonishing effects might be obtained by simultaneously focussing a number of projectors on gaseous formations, such as smoke clouds, or by the inter-play of multiform luminous cones. Finally, the morphology of light and film will gain by the general installation of three-dimensional projection.

the tasks of film production

The creative use of the three main elements of the film—light, motion and sound—depends on the cooperation of a whole body of specialists and technicians. It requires the active collaboration of the photographer, the physicist and chemist, the architect, lighting expert and operator, the director of the film and the author of the scenario. Naturally, the creative use of film is dependent upon the equipment, the technical possibilities of visual recording; the degree to which the recording medium is sensitive to light and sound; the use of ultraviolet and infrared rays; supersensitization, etc. Just as we can train our eyes to see in bad lighting, we shall one day have cameras able to react at high speeds in complete darkness.

The improvement of the film depends on the perfection of color, three-dimensional projection, and sound; upon simultaneous projection; successions of screens arranged in space and smoke, duplicate and multiple screens; new automatic superimpositions and maskings; finally—and mostly—on space-time philosophy.

It seems that a satisfactory solution of such a program can be accomplished only through exhaustive investigation. In the preliminary work, the scattered experiments of the constructivists and non-objective painters and the authors of abstract films should be combined with the elemental conclusions of physical sciences. Further experimentation and practice would then make for a radical change of tasks in motion picture production.

• I tried this in the scenic experiments for the play, "Kaufmann of Berlin," by Walter Mehring, performed at the Piscator Theater in 1929.

•• See "Malerei, Photographie, Film," (Albert Langen Verlag, 1925)

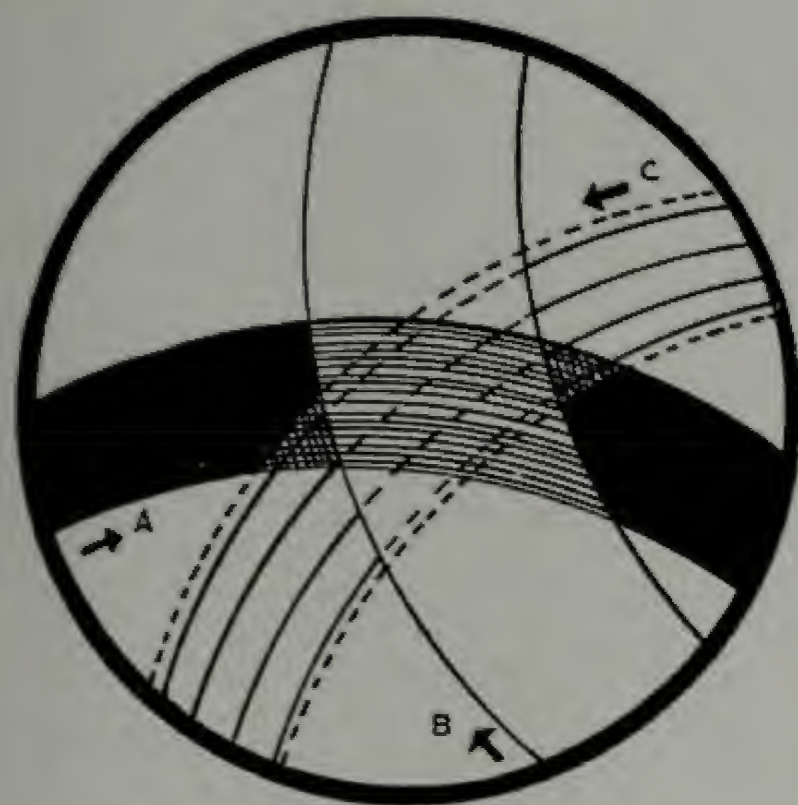


Fig. 386. ○ L. Moholy-Nagy, 1924
Scheme of a simultaneous or poly-cinema
Since the projection screen in the cinema is only an imitation of the easel painting, it is time to make a suggestion for a spatial projection. Here the screen is composed of a concave segment of a sphere—where three films (a, b and c) can be simultaneously shown

institute of light

It is astonishing that after a hundred years of photography and fifty years of films, after the building up of great industrial concerns in which billions have been invested, there does not yet exist an institute of light. The new forms of *commercial* appeal to the public, such as press photography, book illustration, advertising, fairs, illumination, festivals, fashion, theater, film, television, would alone justify the existence of such a laboratory. This should lead to a re-valuation of creative as well as pedagogical tasks since the esthetic rules derived from the past cannot be exclusively used in the education of the new artist-designer.

Potentially, the field of visual expression has immensely expanded through science and technology but practical application has remained fundamentally unchanged. The new possibilities of expression are dependent for their realization upon a high standard of knowledge of light and electricity. It is therefore imperative that there be an institute of light and color or institute of electronics—and not in a technological sense alone but in integration with the arts. The objective is to educate the student by way of systematic elementary training in a syllabus of the new values of light and color, including experimentation with the function and property range of television which also has to be explored in its possibilities without imitation of theater, motion picture or radio. The foundation of such a light workshop which leads to advanced experimentation—on the basis of an artistic and economically productive consciousness—is a vital task that awaits accomplishment.

film script

The film script is the mediator between intellectual concept and visual presentation, a kind of "photo cell" which translates "brain waves" into images. So far, only the now extinct avant-garde has produced manuscripts which were independent of the dramatic tradition going back to the Greek formula of "unity of time, location, and action." Only a manuscript is film-genuine that cannot be fully understood either in bookform or on the stage but exclusively through camera, sound and color.

The following film script "Once a Chicken, always a Chicken" is an attempt I made in this direction. It was written as an afterthought to an existing photomontage. The photomontage was a visual synopsis of a number of events, a multiple image condensation fixed in a single frame.



Fig. 387. ○ L. Moholy-Nagy, 1924

"Once a chicken, always a chicken"

(photomontage)

Visual manuscript for a film so that all of its scenes can be visualized at once

once a chicken, always a chicken•

I

a network of lines covers the screen (an irregular spiderweb?)
a number of eggs roll down an inclined plane—toward the spectator; those in front are very large, those following diminish in size; single eggs jump into the air.

a hand catches the jumping eggs.

a masked man juggles with eggs.

the man catches eggs out of the air, throws them away again, they vanish.

more and more eggs in ever more rapid sequence.

(he underestimated the consequences!)

the man can no longer save himself from the deluge of eggs that rains down upon him.

he runs away, the eggs run after him.

(is the "man" a cinema actor? are the eggs girls?)

the eggs are at first small, then increase in size; some jump, fall, jump again. some break. the inclined plane is transformed into the side of a roof, down which the eggs are rolling and leaping. another egg. it jumps high into the air and runs with lightning-speed down the front of the house onto the street.

down in the street the egg makes a few more leaps.

more and more eggs join it, some break, but the majority roll and leap on.

a street crowded with walking people.

legs in rapid walking motion, eggs rolling and leaping on the ground between them.

the legs move rapidly, but the eggs even faster.

the eggs roll between the wheels of cars and trams, across tram lines, leap over water courses.

drops of water and eggs leap into the air. their whiteness is offset against a dark background.

now the man is walking along the street. he is moving in the opposite direction to that of the eggs. (thus if the eggs are moving from the right to the left, the man is walking from the left to the right of the screen.

in order to draw the audience's attention to the fact that they change their course and follow the man, some eggs begin to leap in the opposite direction.)

many eggs roll after the man: small ones, large ones, along a fairly crowded street.

shops with perambulators. the eggs leap through the open doors of shops.

they jump into prams.

• A motif of Kurt Schwitters' short novel "Auguste Bolte" is included in the script.

ten women, one after the other, push perambulators through the door of a shop.
again walking people, eggs rolling between their legs.
in the foreground the man is running. he turns a corner.
ten pupils of a girls' finishing school, with eggs rolling between their legs.
at the corner eggs leap about in distress—they have lost trace of the man with the mask.
one egg rolls away from the others and rolls on and on.
it finally reaches the door of a house.
slowly the door closes behind it.

the porter's lodge. the staring face of a fat woman doorkeeper.
mouth gaping in surprise.

the door again opens—very slowly; a young woman, fresh and bright, steps out of the doorway. in rhythmic motion she flicks the broken shells of an egg from her dress. the fat doorkeeper runs after the girl, hands her an enormous baby's milk bottle.

with an ironic and superior smile the girl refuses the bottle.
she enters a cafe.

2

short montage sequence showing the interior of the cafe: a waiter balancing a tray; a man who has accumulated all the available newspapers; dogs under the tables.

the young woman enters the garden in front of the cafe. she takes a seat and looks about attentively with a bright expression. outside idlers, hurrying, though they have nothing to do.

the girl looks at her cup.

she raises it to her mouth—it contains chocolate with cream.

small white flowers—myrtles—form a wreath.

the head of the girl with bridal veil and wreath.

shortly afterward the man with the mask appears.

the girl puts down the cup, looks up.

at this moment ten men with similar masks pass outside.

nine of them are relatively blurred.

the girl jumps from her seat.

she runs forward and looks after the men, oblivious to her surroundings

hesitatingly she returns, looks around in a disturbed manner, sits down.

again jumps up;

runs a few paces, then slows down, thinking.

slowly she returns.

halfway she resolutely turns and rushes along between the rows of tables.

the waiter carrying vast quantities of trays and crockery rushes after her wildly shouting and gesticulating in spite of his heavy load.

the man with the newspapers appears with an annoyed expression from behind mountains of newspapers and furiously looks after the disappearing girl.

the waiter with his trays bumps into the man's table.

the man is buried under a deluge of newspapers, which completely engulf him.

the waiter stumbles, but manages to retain his footing.

trays, crockery, food—he balances all of it, not a drop of coffee is spilt from the cups. eggs leap in their glasses.

the girl is standing outside, looks to the right and left.

then she walks to the left, where the ten men are strolling along the street.

the girl rushes after the men.

breathless she approaches them, she stops abruptly, in order slowly to overtake them—

(but)

the men have just reached a street corner. five turn to the left, five to the right. the girl now also reaches the corner.

for a long time she remains standing in despair without knowing what to do.

(which way shall she take?)

she decides to follow the group of five men at the right.

she stops halfway, hesitates.

(shall she not follow the other five?)

she runs back and follows the group at the left.

halfways she is again beset with doubts. at top speed she rushes after the right group.

the five men increase their pace.

breathless, the girl again approaches them, stops abruptly, (in order to pass them slowly, but)

the five men have reached another corner, three turn to the right, two to the left.

(which way shall she take?)

the girl has also reached the corner, she stops, thinks, and decides to take the right-hand course.

halfway she stops and turns to the left, stops, thinks and turns to the right again.

the girl quickly follows the right-hand group of men.

three men walk along the street.

(shall she not follow the others?)

openmouthed, breathing heavily, hatless and with dishevelled hair the girl rushes after them.

close to the men she stops abruptly, brushes her hair back, quickly puts on her hat, prepares to overtake the men—

(when)

she decides to follow the group of three.

(but)

the men have again reached the corner, two turning to the left, one to the right.

the girl reaches the corner. without stopping to think she mechanically turns to the left.

but the men have again reached the corner, when the girl approaches them.

they separate: one turns to the right, the other to the left.

(which man is the "right" one?)

for a fraction of a second the mask of the man walking to the right is sharply defined.

exhausted, the girl reaches the corner.

in a stupor she runs a few paces to the right.

the girl suddenly stops and turns to look after the man who went to the left.

(is this "the" man?)

but the man has already vanished.

the girl then turns to the right again.

far down the street the man is just entering a house.

the girl rushes after him.

completely out of breath the girl is standing in a gateway. it is of an immense size, the girl in front of it very small. in the background there are many other gateways, bearing down upon

the girl as in a nightmare. with a tired gesture the girl wipes her forehead.

she is climbing steps. halfway up the stairs a charwoman washing the steps empties her bucket, and a deluge of water sweeps the girl down the whole flight of stairs again. in vain she struggles against the floods.

she rings a door-bell.

(this scene is repeated several times.)

every time the girl is thrown out of a housedoor, her clothes are more damaged:

first her hat is missing.

then she appears without her coat.

at last her handbag is snatched by some one from inside a doorway.

the bag opens with a sudden jerk: coins and notes fall out, but onto the floor inside the door. the door is banged, the money gone. in vain the girl belabors the door with both fists. thoroughly worn out she turns away.

she knocks at the door of a flat.

a woman opens it—shakes her head.

inside, a shadow appears.

(the man with the mask?)

the girl pushes the woman aside and rushes toward the "man": a dressmaker's dummy!

the woman occupying the flat runs after the girl who has begun to demolish the lamp, chairs, table, etc., in a blind rage.

the women fight.

finally a mighty blow sends the girl flying through the door.

after adjusting her clothes as best she can, the girl continues her search.

completely at the end of her strength she meets a postman.

frantically she commences to search the contents of his enormous bag.

the postman lifts up the girl and flings her aside.

the girl is thrown against a notice-board posting marriage banns. struggling violently she at once attempts to escape from behind the fence.

in the background fencing superimposed upon the window of a landing. the girl is standing at the bottom of the topmost flight of stairs.

half a story higher is the last door.

summoning all her courage the girl climbs the few steps.

she rings the bell.

the door is opened by the masked young man.

the girl wants to rush in at once, but the door is slammed in her face.

dumbfounded she rings again.

in vain: she waits for a long time.

slowly she descends a few steps.

she stops on the landing,

hesitates,

returns to the door and rings again.

again she waits in vain.

she returns to the landing.

she stops in thought, looks at the door and finally returns to it hesitatingly and without hope.

she rings,

waits,

(no result.)

slowly the girl descends two flights of stairs and three steps more.

she turns abruptly, dashes upstairs and throws herself with all her strength against the door, which is shattered by the impact.

3

inside is the man with the mask. he takes no notice whatever of the girl.

he is catching eggs out of the air and throwing them away again. the eggs leap and dance all around him, some break.

the girl who has just entered the room with a mighty bounce after having smashed the door, stops and greets him.

entirely unconcerned the man continues his game with the eggs. the girl hesitates then bows again.

the man still ignores her.

the girl then resolutely approaches and grabs his arm.

the man turns his back on the girl and continues his game.

the girl takes hold of both his shoulders and shakes him furiously.

suddenly the gigantic figure of the marriage registrar looms up in the room; he is wearing a top hat and morning coat. his hand clasps a flaming sword.

(is it a "shot-gun" marriage?)

the man and girl in front of him click their heels in military fashion and join hands. the registrar's sword is transformed into a sash.

he walks around them in a circle and encloses them in a flaming ring.

the registrar vanishes as suddenly as he appeared, by walking through the wall.

the man and the girl sit down at two tables facing each other.

they talk, each listening in a detached manner to the other.

they almost soliloquize. they make grimaces at each other. suddenly the girl jumps from her seat.

the man takes his hat, kisses the woman on her forehead and leaves the room.

the woman goes to the window.

outside children are playing with balls in a park and digging in the sand of a building-plot; laughing faces of children. (springtime.)

the man is going to the registry office.

the registry officer enters the birth of a child, just reported by the man, in a large book.

the household of the young couple is poverty-stricken: dirty children, tiny ones and larger ones. among them the woman, in despair.

the man is standing at the window and looking out at the street below.

trees in full blossom, young girls, cars dashing along bright roads.

the man takes his hat.

he goes to the registry office.

the registrar enters another birth in his book.

the woman is standing at the window.

below children: they play with snowballs in the park and with sledges on the building-plot. laughing faces of children.

the man again goes to the registry office, etc.

nine masked men pass the house.
 the woman runs out of the door of the flat onto the staircase, as
 if intending to follow the men.
 but doubts beset her, she slows down her pace and finally returns
 to the room.
 again the poor household, the neglected children.
 the man returns. without a word of greeting he throws his hat
 furiously onto the bed.
 the smallest children cry.

the law-court in which the divorce is being pleaded.
 the judge; the two, very small, in front of him, are encircled by
 a ring and make desperate attempts to get away from one
 another. after a number of unsuccessful efforts they turn
 against each other and commence to fight.
 the judge places his hands between them and separates them.
 the ring is broken.

the girl hastily retreats, carrying one half of the broken ring.
 holding half the ring, the girl quickly passes down a street.
 a masked man turns and looks after the girl.
 he follows her.
 (does the game reverse itself?)

at the corner the girl meets another man, also masked.
 he joins the first man.
 the girl accelerates her steps.
 more and more men are following her.
 finally the girl throws away her half of the ring. it is trans-
 formed into egg-shells.
 the egg-shells roll after the girl, overtake her.
 the egg-shells enclose the girl.

the egg rolls on with ever increasing speed.
 many masked men are running and running.
 the egg rolls down a hill.
 it comes to rest under a china hen.
 (alliance and safety?)
 the men also roll down the hill. they turn somersaults and stum-
 ble, some remain lying on the ground, others rise again.
 the men stand round the china hen.
 the head of the hen.
 its plaster eyelids twinkle.

1925-1930

Here is a synopsis of another motion picture where a new dramaturgy grows out of pure filmic elements.

The film demonstrates the refined values of the black-white-gray gradations of the photogram (the cameraless photography) in continuous motion. At the same time it uses all possible means of the film technique such as superimpositions—at places seven times—prisms, mirrorings and moving light. Through systematic use of light and shadow in motion it tries to conquer the peculiar dimension of the film, the dimension of space-time.

The film is composed of six parts. (The sixth part of the film was executed in 1930.) I used a kinetic sculpture called "*Licht requisit*" (light prop) as the subject. •

light display, black and white and gray

I

Large quantities of matches are thrown on a metal sheet, glow-
 ing at white heat. They light nearly at once with little explo-
 sions.

Lightning.

Pyre.

Scenes with candle light; with kerosene light; with gas light;
 with electric light; carbide; incandescent light; magnesium
 torch.

The manufacture of an electric light bulb.

Spotlights. Fresnel lens distortions.

Light crosses sky. Lightning.

Light in motion. Iris diaphragm closing—opening; spiral moving;
 large apertures, closing-opening; masks moving, snapping.

Lights at night. Clouds, moving, dissolving, reappearing.

Play of searchlight beams.

Lighted boats at night, fishing with carbide lanterns, fastened
 to their bows.

Airplanes in the night.

Tracer bullets.


Car drives along a highway in deep snow. The road is lit up
 by headlights; relief effects of light and shadow; textures.

Snowdrift.

Moonlight, shadow of twigs on hills and mounds.

Street at night with neon signs. Light spots receding and advanc-
 ing, articulating space. Wet asphalt surfaces; puddles with
 reflections and mirror effects.

• This light prop originally served as an experimental apparatus for "painting with light." My idea was that such mobiles could serve as stage properties (props), therefore the name. The "light prop" was exhibited at the exposition of the Werkbund in Paris, in 1930. It was driven by motor and equipped with 128 electric bulbs in different colors operated by a drum switch. (See pp. 238, 239.)

Figs. 388 a, b, c.  L. Moholy-Nagy, 1922

Synopsis of an abstract film
The photograms stand for various sequences



II

Smelting mill. Glowing molten steel.

Casting; rain of sparks.

Fireworks at a fair. Magnesium balls. Merry-go-round at night. A lighthouse.

The wings of a windmill lighted up. Gyration.

Waterfalls by night, illuminated. Grands eaux, Versailles.

Virtual volumes. Luminous sticks in different color moving and rotating on various planes producing glowing arabesques. Prisms multiply and a mirror doubles the scenes. The same scenes distorted by concave mirrors, reflected in motion by convex-concave (ferrotype) mirror upon a white wall.

III

Theater, Opera. The light equipment. Rehearsal; details of backstage.

The bridge.

Film studio. An artist's studio.

The making of a photogram.

IV

A metal workshop where the different parts of the Light Prop are made.

Vise; lathe; sandpaper belt; disk revolving.

Glass blowing workshop. The glass parts of the Light Prop.

A glass spiral is twisted. Glass grinder grinds segments.

The production of parts made of plastic and of wire mesh.

Assembling of the LIGHT PROP.

Motor; electrical contact; cogwheel transmission; colored bulbs. Flashes.

V

A play of stencils for the Light Prop; perforated metal sheets, grills, grates, etc.

Play of balls (sorting machine). Small ball bearings are thrown on a nickel sheet, from there they fall through a small hole drilled in the center of a vertical partition.

Mechanical toys with great variety of the mechanism in motion.

VI

The shadow of the rotating Light Prop.

The superimposition of metal details with the shadows. The shadow revolving; slowly the shadow of a ball surrounded by strong light, moving up and down over the original shadow.

The Light Prop turns; it is seen from above, below, frontwards, backwards; in normal, accelerated, retarded, reversed motion.

Close-up of details.

A big black shiny ball rolls from left to right. From right to left. Over again.

Positive, negative pictures, jades, prisms; dissolving.

Movements, queerly shifting grills.

"Drunken" screens, lattices.

Views through small openings; through automatically changing diaphragms.

Distortion of reflections. Pendulum.

Blinding moving light flashes. Revolving spiral, reappearing, again and again. Rotation increases; all concrete shapes dissolve in light.

And here is a film script "Do Not Disturb" for a color movie written and executed under my direction by the motion picture class. •



Fig. 389. ○ L. Moholy-Nagy, 1925
"Jealousy" (photomontage)
This is the theme of the film

do not disturb

(a film poem on the theme "jealousy")

The Players: Joanne Filip
 Nick Pat

Hand hangs up sign "Do Not Disturb."
Filip looking through magazines for color illustrations. Pin-up girls.
Tears out sheets; one girl after the other.
Conference on photo montage, at a table—Pat, Filip, Nick.
Pat and Filip laughing.
Studio; still camera. The iris shutter opens.
Cut out screen of tracing paper: a man's silhouette. Filip comes, nearly filling the cut-out. Pat measures light.
(The photo will be used for a photomontage "jealousy".)
Picture taking with flash light.
More pictures are taken as parts of the photomontage.
Pasting single figures on board. Drawing lines.
Thumbtacking the ready montage "jealousy" on the wall.
Judging.

•
Pat, Nick and Filip leave school. Happily, jokingly. On the street Nick elbows accidentally a passing girl, Joanne. Both laugh, embarrassed. Nick winks at Joanne, Pat is offended. Isn't she his sweetheart?
Nick turns back to glance at Joanne again.
Pat leaves abruptly.

•
Nick and Filip settle down to work studying anatomy and

mathematics books.
They are bored.
Filip pours sherry into a glass.
Nick is taking a photo out of his wallet: Pat.
Nick fills his glass, too; both of them drink.
Joanne's picture appears in glass—
Combing her hair; mouth, lipstick—
charming—

Boys become more tired—
Color display (indicating a dream-like state).
The boys sleep.

•
Pat in doorway multiplied with prism.
The boys sleep.
Their bodies remain in the chair but, ghostlike, they move away and leave the room.
Pat again in doorway surrounded with miraculous light effects. She smiles, moves around with promising gestures.
The boys nervously walk towards her but Nick is upside down. Pat winks with her eyes, her lips move with inviting smile; lips multiplied.
Boys hurry restlessly, their heads severed from the body are moving forward quicker than their legs.
They try to catch each other, run fast. Jealousy?

Pat in doorway.
Close-up of Filip with sharp—unsharp pulsations—dream—dream—dream.
Joanne looks out of a window. Many Joannes look out of many windows. They all smile, laugh.
Two feet running (Nick).
Suddenly a city landscape appears with lampposts and bridge. Filip walks around a lamppost; he is in focus, sometimes unsharp, the scene dizzily revolving.
Is he waiting for Pat?
Filip speeding up on an endless fire escape—

Hand opens a door:
Girl's mouth behind a black mask—
A terrific mouth!
Door is closing.
Hand opens another door:
Big fingers move, play, and form a funny birdish face of a woman. (Repulsive encounter when one is looking for a nice girl!)

"Do Not Disturb" is hung on doorknob.
Light display—dream atmosphere.

Other door is opened:
A girl's face in halves—yellow—purple—big eyes—
(terrible!)
The fingers play—more distorted now.
Door closes again.
Light display, door opens:

• Richard Filipowski, Robert Graham, Stanley Kazdailis, Patricia Parker, Joanne Reed, Nick Savage, Walter Schwartz, Beatrice Takeuchi.

*A nose wiggling (upside down). It looks like a pig's face.
(A nightmare!)*

Door closes.

Light display.

Door. Door knob dodges hand, trying to avoid being gripped and opened—but the hand, at last, grabs the handle. Door opens:

The cut-out screen from the beginning. Pat's shadow—whirling shadows—Filip's shadow—fight—kiss—Pat throws Filip back.

Sign appears in flames:

"The management wishes to inform you that the waiters already received their gratuities."

Head, a large black silhouette, opens frighteningly up in the middle with a wondering large eye.

Door closes.

Light display.

Another door opens:

Flames fly through space. From the flames the pictures of the pin-up girls emerge; Nick standing on ladder, catches them. Nick lifts a hammer, nails the pictures on a wall and tears them down. Pat's face pulsates through this scene. (Is she jealous?)

Translucent screen with the man's silhouette again. Behind it the ladder.

Filip jumps from ladder, with violent motion he comes through screen which begins to burn.

(Is he jealous?)

Filip swings the hammer—distorted eyes and mouth; rubber-like, twisted fingers gesticulate. Where is Pat?

The fingers elongated, play a piano.

Phonograph set in motion.

Nick and Joanne dance.

(Nick and Joanne? Is it not Nick and Pat? No! Nick and Joanne.)

Only the feet—quick—quicker.

Piano quicker—

Disc faster—

Dance quicker.

Piano.

Feet.

Disc running wildly—red and black spirals emerge, growing forwards, diminishing backward.

Dancing wildly.

Joanne's happy head turning, whirling like a top.

Ecstasy.

Nick touches Joanne too intimately.

She shoves him away.

Joanne and Nick stand in front of each other.

Joanne taps the floor nervously.

Nick is angry. He looks at an apparition:

Joanne's young face combined with the face of a wrinkled, aged woman.

Light display. Pat's laughing face.

Gratuities sign burns.

Nick's head, angry, eyes frown—

Water rushes with great power.

Joanne and Nick go together; stand still again.

From rich foam soap bubbles grow into each other.

(Anger! anger! anger!)

Girl nervously taps foot.

Gigantic mouth gossiping, scolding.

Mud, lava—cooking, steaming, heavy bubbles tossing up as little volcanoes.

Boy lets cigarette fall in rage, kicks it with foot.

Colored flames.

Nick spins his keys fast on a chain, a ball rushes near and far.

Steam; ice cubes emerge from it slowly.

Nick is calmer.

River smoothly flowing—sun reflects on water as many-sided prism.

Fingering a red rose; casually dropped into the water.

Bluish colors dissolve in water—cooling down of emotions—

"Do Not Disturb" hanging on door.

Bare landscape.

"Do Not Disturb" hanging on tree blown by wind.

Sign flies through air—

Sign on asphalt, moving, flying, resting, flying.

Autos run over it.

Pat's head revolves like a top.

Filip's head—laughing, whirling—superimposed.

Scissors cut the film.

Fig. 390. O Niko Geane, 1942

Shadow of the future (double exposure)



literature

An analysis of expression in different media shows that behind all types of work there is a unifying experience, namely, the consciously absorbed or passively endured reality common to all people living in the same period. Thus literature expressing this reality must be considered an integral part of the student's training, in addition to the visual arts. This is one more step in the process of becoming conscious of the new directions and the new concept of life.

first steps

In order to experience and participate actively in all the aspects of contemporary literature the student must be acquainted through records and concerts with

(1) the tendencies of contemporary composers such as Stravinsky, Bartok, Schoenberg, Hindemith, Krenek, Milhaud, Copeland, Varese and others. Their works offer an enlightening analogy to modern literature as well as to contemporary painting. Like cubism and constructivism the modern polyphonic music with its interwoven, intricate traits, the experiments of the bruitists ("noise-ists" pioneered by the futurist Luigi Russolo, 1913), will lead to an analysis of literary equivalents; to the

(2) simultaneists, futurists, as they appear in the work of Guillaume Apollinaire, F. T. Marinetti, Vladimir Mayakovski and from there to the

(3) expressionists and proto-surrealists: August Stramm, Lajos Kassak, Franz Kafka, Yvan Goll, Ezra Pound, Gertrude Stein, Jean Cocteau, Blaise Cendrars, Bert Brecht, etc., to the

(4) dadaists: Tristan Tzara, Jean Arp, Hugo Ball, Richard Huelsenbeck, Kurt Schwitters, Ribemont-Dessaignes, etc., to the

(5) surrealists and

(6) James Joyce

Besides these more or less modern trends the student may study:

(7) the historic background of world literature;

(8) poems by children;

(9) poetry of the psychotic.

verbalized communication

Literature can be defined as the verbalized form of communication generated by psychological and biological forces.

Literature—in the same way as the other arts—has its inherent laws through the structural use of its own medium: language. Language is derivative, is the product of a historic development. The words, beside their intellectual historic meaning, also carry subconscious, emotional connotations. Literary evaluation begins at this level, beyond the purely logical content of communication.

“The only peculiar characteristic of literary experiences is that they are evoked by linguistic symbols rather than by other stimuli. . . . But the symbolic process here is not a crude one. The words themselves in a poem or play or novel tell a story, to be sure, but the pattern that the story takes, the events within the story and their relationship to each other, are themselves a complex symbol. And the meaning of this complex symbol is the original experience. The judgment of a work of literature, then, is a judgment of its value as an experience: but the task is delicate and sensitive, and great harm may be done by a crude or naïve or legalistic approach. What is to be evaluated is the evoked experience as a whole, and the details are to be judged not as facts but as evocative symbols.”•

One has to add to this that “literary experience” must be enlarged upon by the inclusion of sound and rhythm, functionally similar to music in their psychophysical effect. In the new literature these elements are included as essential components and they would appear nonsensical if one would not accept them on their own level—as “music.” Through these elements the new literature attempted to rejuvenate language so that its emotional, expressive sound qualities could become as much differentiated as the colors or textures in the contemporary visual arts. The inclusion of argot, scientific and artistic idioms and grammatical analogies derived from different languages helped to accomplish this on a broad scale.

• The quotation is from a review by S. I. Hayakawa, “Poetry,” May 1942, on T. C. Pollock, Kenneth Burke and Allan Tate.

Poe once said that “cellardoor” is the loveliest sounding and most pleasing combination of English words. Everyone has from time to time a little private musical delight with one word or another which suddenly takes on a quality entirely unbecoming to its normal, pedestrian function. Suddenly, it “tintinnabulates.” There should be very little poetry if words had not this faculty.

The elusiveness of such complex relationships does not allow much more than the description of their isolated emotional qualities, just as Goethe or Kandinsky described the "psychophysical" effects of single colors or color pairs. And if the language of both Goethe and Kandinsky was insufficient to define even the meaning of multiple color combinations when they appeared in complex relationships, as for example, in a painting, it is rather doubtful whether—at this moment—we could with greater success interpret the complexity of a literary form. Another possible approach would be to see literature as it is embedded in its time, conditioned by society; as the emotional mirroring of personality and group problems. Literature—as any other art—by the unconscious logic of relationships and by their implied consequences can express and forecast trends. Thus literature may become the vehicle for an *emotional* orientation toward social and cultural tasks. However, this dependence upon time-bound forces does not necessarily mean photographic reporting of reality, the portrayal of happenings.



Visualization, verbalization, music and dance are tools we have to express a concept and to master the new conditions in and around us. Visualization is the task of the visual artist. Verbalization is the domain of the writer and the poet. But "you cannot express unless you have a system of expression; and you cannot have a system of expression unless you have a prior system of thinking and feeling; and you cannot have a system of thinking and feeling unless you have a basic system of living. . . . These views may not be expressed categorically and literally as in a catechism, but they are of the essence of all such works, and indeed a great art work is inconceivable which is not the expression of the philosophy of life held by its creator."• There is, however, not only a personal dynamic "philosophy of life"; every political and economic system also has its often obsolete philosophy of a decaying status-quo. And through the various channels of communication, its literary representatives expound that philosophy or camouflage it—as the case may be. Ninety percent of the average literature contains clichés, mealy-mouthed homiletics, intentionally or unintentionally misdirecting and wasting human energies. An old Hungarian quip at a politician's empty declamation, has it: "Here is nothing, but hold it fast!"

Writers producing this kind of material drug the gullible and enervate the healthy. This is not the straight counterrevolutionary, fascist propaganda also contained in much of popular literature and therefore palatable to most people. Rather it is a more insidious element of pseudo-problems wrapped in sweet love stories, hair-raising adventure, moonlit hocus-pocus and the like, replacing solid structures by gilded facades in the effort to maintain an outmoded form of living. The result is indifference to the ungilded truth concerning the social fabric and indifference to the use of language with its revolutionizing, perceptive values and new rhythm. People

• "On Poetry," by Louis Sullivan in "Kindergarten Chats," Scarab Fraternity Press, 1934.

fall easy victims to demagogues who convert this indifference into a phlegm and brutality. Serious authors in every period tried to counteract this tendency. Such writers as Walt Whitman, Rimbaud, Lautréamont, etc., had deeply satirized this process.

Whitman and Lautréamont

By 1849 most of the civil wars had ended in Europe. They were fought as holy wars of liberation of the working man. Most of the participants were inspired by idealism and humanitarian hopes. They saw the dawn of a new era coming—a greater humanity—the end of all hypocrisy. Their hopes turned to tragic disillusionment. After the civil wars, corruption rolled over the world. The *nouveaux riches* came to the forefront. The snobbism of Napoleon Third overtook the globe. In the muddy waters sharks swam, devouring the small fish. Whitman was in a holy fury:

*"Respondez! Respondez!• (The war is completed—the price is paid—the title is settled beyond recall;)
Let every one answer! let those who sleep be waked! let none evade!
Must we still go on with our affectations and sneaking?
Let me bring this to a close—I pronounce openly for a new distribution of roles;*

*Let that which stood in front go behind! and let that which was behind advance to the front and speak;
Let murderers, bigots, fools, unclean persons, offer new propositions!
Let the old propositions be postponed!
Let faces and theories be turn'd inside out! let meanings be freely criminal, as well as results!" . . .*

And Whitman goes on with imprecations as desperate and acid as literature has ever produced. He who gave sweat, blood, body and soul, everything, to the right cause stands helpless, the great betrayal sweeping over him and the innocent millions. "Let insanity still have charge of sanity!"

*"Let the sun and moon go! let scenery take the applause of the audience! let there be apathy under the stars!
Let freedom prove no man's inalienable right! every one who can tyrannize, let him tyrannize to his satisfaction!
Let none but infidels be countenanced!
Let the eminence of meanness, treachery, sarcasm, hate, greed, indecency, impotence, lust be taken for granted above all!
let writers, judges, governments, households, religions, philosophies, take such for granted above all!
Let the worst men beget children out of the worst women!
Let the priest still play at immortality!
Let death be inaugurated!
Let nothing remain but the ashes of teachers, artists, moralists, lawyers, and learn'd and polite persons!
Let him who is without my poems be assassinated!
Let the cow, the horse, the camel, the garden-bee—let the mud-fish, the lobster, the mussel, eel, the sting-ray, and the grunt-*

*ing pig-fish—let these, and the like of these, be put on a perfect equality with man and woman!
Let churches accommodate serpents, vermin, and the corpses of those who have died of the most filthy of diseases!
Let marriage slip down among fools, and be for none but fools!
Let men among themselves talk and think forever obscenely of women! and let women among themselves talk and think obscenely of men!
Let us all, without missing one, be exposed in public, naked, monthly, at the peril of our lives! let our bodies be freely handled and examined by whoever chooses!
Let nothing but copies at second hand be permitted to exist upon the earth!
Let the earth desert God, nor let there ever henceforth be mention'd the name of God!
Let there be no God!
Let there be money, business, imports, exports, custom, author-*

• Published first in 1856 but with significant lines added to it after the civil war.

ity, precedents, pallor, dyspepsia, smut, ignorance, unbelief!
Let judges and criminals be transposed! let the prison-keepers
be put in prison! let those that were prisoners take the keys!
(Say! why might they not just as well be transposed?)
Let the slaves be masters! let the masters become slaves!
Let the reformers descend from the stands where they are for-
ever bawling! let an idiot or insane person appear on each
of the stands!
Let the Asiatic, the African, the European, the American, and
the Australian, go armed against the murderous stealthiness
of each other! let them sleep armed! let none believe in good
will!

Let there be no unfashionable wisdom! let such be scorn'd and
derided off from the earth!
Let a floating cloud in the sky—let a wave of the sea—let
growing mint, spinach, onions, tomatoes—let these be exhibited
as shows, at a great price for admission!
Let all the men of These States stand aside for a few smouchers!
let the few seize on what they choose! let the rest gawk,
giggle, starve, obey!
Let shadows be furnish'd with genitals! Let substances be de-
prived of their genitals! . . ."

(Walt Whitman: "Respondez" from "Leaves of Grass," The Heritage Press, N.Y.)

What power of despair! At the same time—clad in "nonsense"—what daring clarity about the condition into which the ruling class was sliding.

Whitman was the grand old popular revolutionary of poetry in the 19th century. He was a part of the new philosophy, the prophets of which were Darwin with his theory of evolution, the monists and pragmatists with the suddenly acquired security of their new scientific and utilitarian values. Natural science, they held, would solve the world's problems. Whitman was also responsible for the ideological change which led to the synchronization of science and democracy, a close-up naturalism like a glorified photograph. His task was to find the adequate objective language for this new content. He discarded the aristocratic, formal, rhyme-bound verse for the free rhythm of diction and word combinations of associate dynamics.

Even Count Lautréamont (Isidore Ducasse, 1846-1870) poet of the subconscious, the most subjective writer of the 19th century, turned against sentimentality and declared his agreement with the objective trend of the sciences: "You should not weep in public. . . . We should take up again the thread of the impersonal poetry."

Lautréamont lived in France's dark period under Napoleon Third. In today's terminology, perhaps loosely, we could call the emperor a fascist. By clumsy cheating and lying he eliminated human rights. The best French patriots were taken to prison or were exiled without public clamor. The corruption of court and law, judges, lawyers and speculators had driven the country toward chaos. But the farmers, merchants and middleclass employees were intoxicated with a propaganda of prosperity and bogus reforms. What could a sensitive writer do about such contemptible reality? Go into exile as Victor Hugo, sitting homesick on a Guernsey rock, thundering his wrath against the Emperor like a prophet of the Old Testament?

In his "Chants de Maldoror" (1868) Lautréamont gave a magnificent satire of the age by clothing seemingly senseless trash in the apparel of logical context.

"... The first and only thing I saw was a light-coloured rod composed of cones thrust into one another. This rod was moving about! It was walking around the room! Its violence was such that the floor shook beneath it. With its two ends it tore huge gashes in the walls, and resembled a battering-ram beating against the walls of a besieged city. Its efforts were useless for the walls were built of freestone. I saw this rod, when it struck against the wall, bend like a steel blade and bound back like an elastic ball. So it was not made of wood! Then I noticed it

coiled and uncoiled with ease, like an eel. Although as tall as a man it did not hold itself erect. Sometimes it tried to do this and exhibited one of its ends at the grating. It bounded about impetuously, fell again to the ground, and could not stave in the obstacle. I examined it more and more narrowly and finally I perceived that it was a hair! After another violent struggle with the material that hemmed it in like a prison, it laid itself down on a bed that was in that room, its root resting on the sheets and its pointed end against the bed's head. . . ." •

The quotation has an extraordinary similarity to Poe's diction, but the motives are different. While Poe's interest was somewhat introvertedly concentrated on the between-layers of existence, the intangibles of the subliminal vision, almost anticipating Freud's psychoanalysis, Lautréamont—notwithstanding the magic of his own insights into the subconscious—took a belligerent stand toward his time and contemporaries. If the social system were corrupt and evil, he showed himself super-evil. He vented his rage into blasphemy; he took "nonsensical" symbols as an instrument to stir his fellow citizens into consciousness of the moral chaos, using these symbols as a kind of homeopathic remedy.

S. I. Hayakawa's review (quoted above) comments on another aspect of this life-saving function of literature:

"The power to manipulate symbols for one purpose or another is part of man's survival mechanism. Burke's concern is how men manipulate symbols in order to fulfill inner needs, to cope with distress or frustration, to resolve conflicts. . . . Art is, to Mr. Burke, 'a remarkably complete kind of biological adaptation.' Even as our bodily organization heals itself of injuries by means of self-active physiological mechanisms, so our evaluational organization (mind, spirit) heals itself by means of the spontaneous operation of symbolic mechanisms. 'Poetry . . . is undertaken as equipment for living, as a ritualistic way of arming us to confront perplexities and risks.'"

• From "Maldoror" (Chapter 3) translated by Guy Wernham. It is interesting to compare this passage with the following from Poe's "The Pit and the Pendulum":

"My outstretched hands at length encountered some solid obstruction. It was a wall, seemingly of stone masonry—very smooth, slimy, and cold. I followed it up; stepping with all the careful distrust with which certain antique narratives had inspired me. This process, however, afforded me no means of ascertaining the dimensions of my dungeon; as I might make its circuit, and return to the point whence I set out, without being aware of the fact, so perfectly uniform seemed the wall. I therefore sought the knife which had been in my pocket when led into the inquisitorial chamber, but it was gone: my clothes had been exchanged for a wrapper of coarse serge. I had thought of forcing the blade in some minute crevice of the masonry, so as to identify my point of departure. The difficulty, nevertheless, was but trivial, although in the disorder of my fancy, it seemed at first insuperable. I tore a part of the hem from the robe, and placed the fragment at full length, and at right angles to the wall. In groping my way around the prison, I could not fail to encounter this rag upon completing the circuit. So, at least, I thought, but I had not counted upon the extent of the dungeon or upon my own weakness. The ground was moist and slippery. I staggered onward for some time, when I stumbled and fell."

In America after the Civil War, there came a long period of high-pressured industrial development. Achievements of production and distribution were consolidated; the power of the industrial pioneers anchored in monopolies, supported by legislation and press, used all means of persuasion to manufacture a make-believe Canaan. Over the clear voice of the democratic prophet, Whitman, the new generation placed its muffling hand. The Franco-Prussian war left Europe in a similar condition.

Apollinaire. Morgenstern. Stein.

But there was a storm brewing. Youth felt the growing unrest—felt everywhere double-dealing, especially in the sly attempts to preserve obsolete institutions that had had their day. "One cannot carry everywhere the corpse of one's father," Guillaume Apollinaire sighed (1912). He and his friends were longing for the "immensity of space" as the intellectual antipode to the immensity of the "frontiers" and the immensity of the potential markets of the steel, oil and beef barons: a world of plenty and privileges, and of famine and want. This was the world which stirred up the thought and imagination of artists. How to change, how to overcome it? Where to start? Would political upheavals help? Social utopias? What is the duty of the artist among the economists, philosophers, statisticians and revolutionaries who fight against reaction? The artist and poet might have another way to turn the wheels! Mallarmé (1874) demanded that "the initiative be given only to the word." The poet should master the word instead of being its victim.

One might look upon Mallarmé's statement, which gives priority to the individual unit of literary expression, as a reflection of 19th century individualism. It seems to indicate that the artist living in a certain period has to take up the attitude of his milieu. It is much too true that the mechanics of creation strongly reflect the dominating events and attitudes of a period. But there is a reciprocity. The end effect is dependent upon the interpretation; upon conforming or opposing; being burned or only singed. The revolutionary potentialities of the creative mind often arrive at an unexpected terminal shooting past the official stop signs. Mallarmé in his attempt to give the individual word a greater impact, transcended the atomization of his age. The "word" was chosen by him as the basic element in order to clarify its quality and potentiality, so that afterwards one could put it into effective use—for the social purpose beyond "the pathos of the individual." The same is true of Guillaume Apollinaire. His ideogram "*Aussi bien que les cigales*" shows his ferocious contempt for the bourgeois and implicit in it is an attempt to build up a more biological approach to life. Apollinaire's poem throws light upon his situation and that of others of his contemporaries. The 19th century artist was dependent for his livelihood upon bourgeois patronage which quickly degraded him to lackey service. To exercise criticism, Apollinaire had to use some kind of deception. So he descended to the lowest creature, to the funny cricket, and elevated it to an attractive symbol; the disguise as of the jester who declares the truth by turning somersaults in an intellectual dimension. There the intensity of spiritual space, "the adorable joy of the solar peace," became a substitute for the lost independence.

The "calligrams" of Apollinaire have their counterparts in the baroque literature—text printed in certain shapes such as a vase or a bird. But they are re-occurring as an eternal problem also in the work of the present generation. Here is the second part of a poem by Herbert Read, the English poet:

Beata Palma

New children must be born of gods in
a deathless land, where the
uneroded rocks bound clear
from cool
glassy tarns, and no flaw is in mind or flesh.

Sense and image they must refashion
they will not recreate
love: love ends in hate; they will
not use
words: words lie. The structure of events
alone is

comprehensible and to single
perceptions communi-
cation is not essential.

Art ends;
the individual world alone is valid

and that gives ease. The water is still;
the rocks are hard and veined,
metalliferous, yielding
an ore
of high worth. In the sky the unsullied
sun lake.

Read states that "The form of this poem is a spatial structure—a repetition of a pattern of syllables."

The rhythm of the poem runs counter to the spatial structure: it is a counterpoint to the form.

Thus the form (space) and rhythm (time) of the poem, instead of running a parallel series, are held in tension against each other."

As Well As the Crickets

People of the South, people of the South, you have not then watched the crickets which you do not know how to dig that you do not know how to enlighten you nor to see. What do you need to see as well as the crickets. But you still know how to drink like the crickets. Oh, people of the South, people of the sun, people who ought to know how to dig and to see as well at least as the crickets. So what! you know how to drink and no more know how to piss usefully like the crickets the

day of glory will be that when you will know how to dig to go out well to the sun.

Dig, see, drink, piss like the crickets.

People of the South it is necessary to see to drink to piss as well as the crickets in order to sing like them.

THE ADORABLE JOY OF THE SOLAR PEACE.

The poem about the cricket was considered indecent in a society where even the "stomach" was regarded as too shocking a reality. But this was the same society which tried to keep up the fiction that babies are brought by storks; which punished with contempt those ill with venereal disease; and which maintained a prim mask behind which corruption and graft thrived. Whitman, Lautréamont, Apollinaire hurled pagan words in the face of their contemporaries, not in order to be indecent, but to prove that one need not be ashamed of "calling a spade a spade."

For the burgher the emotional connotation of such poems was "terrible." Even decades later society could not bear their stormy, atmosphere-cleaning quality. James Joyce's "Ulysses," for example, was literally burned.♦♦

•

"The Funnels," an ideogram by Christian Morgenstern, Germany (1905), is similarly but more innocently one of the starting points of the new "liberated literature." It may seem unfair to compare it with the bitter irony of Apollinaire. Still, it is an attempt to break the conventions of content and the customary form of typography, and with it, symbolically, the content and form of society which applied its great rules of the past only mechanically. It is also an attempt to render simultaneously object, word and image, a short cut to coordination and interchangeability of the values of a coming new age.

Fig. 391. Christian Morgenstern, 1905
Ideogram "The Funnels"
(from the book "Galgenlieder")



The Funnels

Two funnels are roving through the night
Through their bodies' narrowed shaft
Pours white moonlight
Calmly and merrily
On their walk
Through the
Woods
e t
c
.

♦ from "Apollinaire" (published by L'Esprit Nouveau, Paris, 1924)

♦♦ It took ten years of legal controversy until the brilliantly written decision of Judge Woolsey (1933) lifted the ban on the book denounced as "obscene."

The same "naive" attitude appears in the work of Gertrude Stein. Her seemingly primitive stammering, her repetitive childlike statements hide sharp criticism. It is a canny form of attack in the guise of sancta simplicitas. Hiding in the skin of the innocent and unsophisticated, she often offers the most shocking of all statements, the truth. The use of slang and the cheap words of silly conversation, signify a new way to introduce totality of social structure into literature as VanGogh did with the painting of a pair of shoes, potatoes and straw-covered chairs. The commonplace, pebbles worn smooth by the streams and waves of routine talk, acquires in Gertrude Stein a polished, well-shaped quality. Through the relationship which she discovers between such fragments she exposes—like the cubist collages and the motion pictures—all their discreet connotations and deeply characterizing values. "Great style? Nothing is more beautiful than the commonplace," said Baudelaire.

Sherwood Anderson's introduction to the work of Gertrude Stein* has a passage which shows Stein's great affinity with the theory of the revolutionary French writers of the 19th century, especially with Mallarmé. ". . . One works with words, and one would like words that have a taste on the lips, that have perfume to the nostrils, rattling words one can throw into a box and shake, making a sharp jingling sound, words that, when seen on the printed page, have a distinct arresting effect upon the eye, words that when they jump out from under the pen one may feel with the fingers, as one might caress the cheeks of his beloved. And what I think that these books of Gertrude Stein do in a very real sense is recreate life in words."

The skill of Gertrude Stein in evoking life with words is greatly due to her ability to verbalize images. Her writing very often reads like a shooting script for a motion picture, including sound effects.

From "Geography and Plays"
by Gertrude Stein (1922)

*"Ink of paper slightly mine breathes a shoulder able shine.
Necessity.
Near glass.
Put a stove put a stove hoarser.
If I was surely if I was surely.
See girl says.
All the same bright.
Brightness.
When a churn say suddenly when a churn say suddenly.
Poor pour procent.
Little branches.
Pale
Pale
Pale
Pale
Pale*

*Pale
Pale
Near sights
Please sorts.
Example.
Example.
Put something down
Put something down some day.
Put something down some day in
Put something down some day in my
In my hand.
In my hand right.
In my hand writing.
Put something down some day in my handwriting.
Needless less
Nevertheless
Never the less*

* "Geography and Plays," 1922, The Four Seas Co.

Pepperness.
 Never the less extra stress.
 Never the less tenderness.
 Old sight.
 Pearls.
 Real line.
 Shoulders.
 Upper states.
 Mere colors.
 Recent resign.
 Search needless.
 All a plain all a plain show.
 White papers.
 Slippers.
 Slippers underneath.
 Little tell.
 I chance
 I chance to
 I chance to do
 I chance to.
 What is a winter wedding a winter wedding.
 Furnish seats.
 Furnish seats nicely.
 Please repeat
 Please repeat for.
 Please repeat.
 This is a name for Anna.
 Cushions and pears.

Reason purses.
 Reason purses to relay to relay carpets.
 Marble is thorough fare.
 Nuts are spittoons.
 That is a word.
 That is a word careless,
 Paper peaches.
 Paper peaches are tears.
 Rest in grapes.
 Thoroughly needed.
 Thoroughly needed signs.
 All but.
 Relieving relieving.
 Argonauts.
 This is plenty.
 Cunning saxon symbol
 Symbol of Beauty.
 Thimble of everything.
 Cunning clover thimble.
 Cunning of everything.
 Cunning of thimble.
 Cunning cunning.
 Place in pets.
 Night town.
 Night town a glass.
 Color mahogany.
 Color mahogany center
 Rose is a rose is a rose is a rose. . . ."

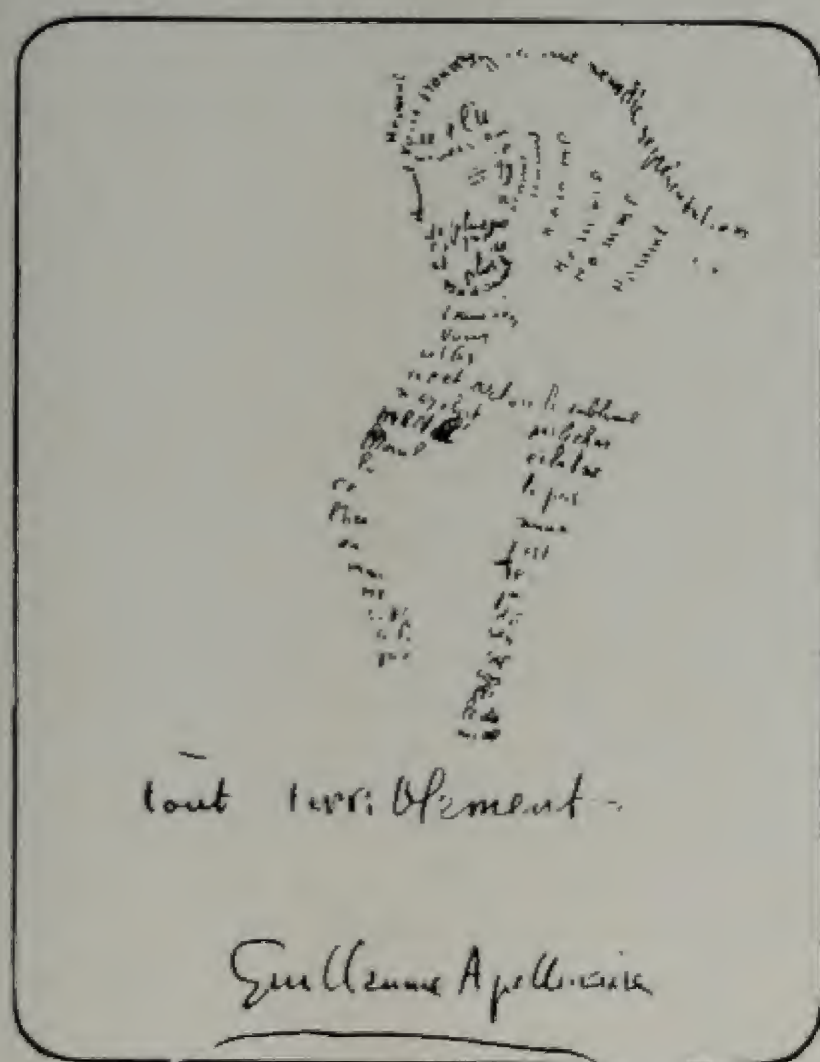


Fig. 392. Guillaume Apollinaire, 1916
 Ideogram
 (from the book "Caligrammes, poèmes de la paix et de la guerre, 1913-1916")
 Ideograms were used rather soon after the invention of the letter press, especially in the times of the baroque. However, their decorative meaning was overshadowed by the functional purpose of expressive legibility of the new ideograms by Apollinaire

The idea of the motion picture, namely, to record a story in images, may also have been the stimulus for the ideograms of Apollinaire. He may have started with a personal aim—to create—as the mediæval troubadours—a copyrighted, inimitable expression for himself, a visual slang of the super-intellect. The real effect of this step, however, was to liberate literature from the disparateness of the eye and ear, from the monotony connected with the dullness of regular typography. While a normally printed text is usually read by the eye, yet it has only been conceived of as a sign language for the ear. By exchanging the visual appearance of the words, by printing them in unusual shapes, larger, smaller, distorted, etc., a visual dimension is added; one perceives the words with a combined sharpness of the eye and the ear. These ideograms may appear as harmlessly decorative as the emblems of the 17th century, but they actually dynamited convention.* Apollinaire introduced the "annoyance-use" of words with physiological connotation. He also scoffed at normal syntax; discarded the conventional printing with the horizontal-vertical axis; he sought an "eye-opener" with which to startle the complacent citizen. The eye-ear sensation (about 1913) is only one of the practices which Apollinaire introduced into literature. His great innovation was the poetry of "simultaneity." Simultaneity,

• "The only genuine art contribution of any epoch is not one that mirrors its epoch, but one that supplies what the epoch lacks." (James Johnson Sweeney, "transition" No. 22)

meaning synchronization—happenings at the same time—was a time coordination of space and action, the beginning of “global thinking.” It signaled potential events at various geographical spots, emphasizing relationships of the *single* element in various fields; in this way further developing Mallarmé’s start and the cubist technique of “collage”, the predecessor of “photomontage” and the “montage” of the film.

futurism

Around 1900, times seemed to be rather uninspiring. Everything appeared to be saturated, lethargic. America sallied forth in her war against Spain; the Boxer Revolt had been suppressed and the Boers overcome. The Russian Revolution of 1905 had been lost, the czar triumphant. Capital and labor had temporarily made peace and the unions, especially the social-democratic, rested on their laurels. The world was definitely “boring.”

Then in February, 1909, F. T. Marinetti, an unknown Italian writer, threw the “Initial Manifesto of Futurism” like a bomb into the pages of “Figaro,” in Paris. Dazzled—as most of the intellectuals of his time—by Schopenhauer’s pessimism, Nietzsche’s superman romanticism plus the technical civilization and its master, the engineer, he staked everything on one card: the machine, its “vitality” and “speed.”

Fig. 393. Poster for a futurist meeting in Milan
The audience is represented by catcalls



- “1. We shall sing the love of danger, the habit of energy and boldness.
2. The essential elements of our poetry shall be courage, daring and rebellion.
3. Literature has hitherto glorified thoughtful immobility, ecstasy and sleep; we shall extol aggressive movement, feverish insomnia, the double quick step, the somersault, the box on the ear, the fisticuff.
4. We declare that the world’s splendor has been enriched by a new beauty; the beauty of speed. A racing motor-car, its frame adorned with great pipes, like snakes with explosive breath . . . a roaring motorcar, which looks as though running on shrapnel, is more beautiful than the Victory of Samothrace.
5. We shall sing of the man at the steering wheel, whose ideal stem transfixes the Earth, rushing over the circuit of her orbit.
6. The poet must give himself with frenzy, with splendor and with lavishness, in order to increase the enthusiastic fervor of the primordial elements.
7. There is no more beauty except in strife. No masterpiece without aggressiveness. Poetry must be a violent onslaught upon the unknown forces, to command them to bow before man.
8. We stand upon the extreme promontory of the centuries! . . .

(A passage from the “Futuristic Manifesto” by F. T. Marinetti.)

Why should we look behind us, when we have to break in the mysterious portals of the Impossible? Time and Space died yesterday. Already we live in the absolute, since we have already created speed, eternal and ever-present.

9. We wish to glorify War—the only health giver of the world—militarism, patriotism, the destructive arm of the Anarchist, the beautiful Ideas that kill, the contempt for woman.
10. We wish to destroy the museums, the libraries, to fight against moralism, feminism, and all opportunistic and utilitarian meannesses.
11. We shall sing of the great crowds in the excitement of labor, pleasure or rebellion; of the multi-colored and poliphonic surf of revolutions in modern capital cities; of the nocturnal vibration of arsenals and workshops beneath their violent electric moons; of the greedy stations swallowing smoking snakes; of factories suspended from the clouds by their strings of smoke; of bridges leaping like gymnasts over the diabolical cutlery of sunbathed rivers; of adventurous liners scenting the horizon; of broad chested locomotives prancing on rails; like huge steel horses bridled with long tubes; and of the gliding flight of airplanes, the sound of whose propeller is like the flapping of flags and the applause of an enthusiastic crowd.”

While this manifesto at first glance appears somewhat similar to the “Respondez” of Whitman, nevertheless there is an unmistakable difference. Behind Whitman’s poem there was the fighter for a good cause; for the exploited and betrayed. Behind Marinetti’s manifesto stood a man, fed not on life but on literature, the superman (“Uebermensch”) ideal of Nietzsche.



Fig. 394. F. T. Marinetti, 1919 as the announcer of futurism

Annoyed by the habitual, he tried to liberate himself from age-old conventions. An immature way of expressing this sense of depression has always been through exhibitionism. Insolent, with no feeling of responsibility for the possible consequences, he wished to see how far he could go in his plan “épater le bourgeois.” The young artists of Italy and France were happy to fly at this tangent, shooting into rebelliousness. They felt the coming storm, the violence *qua* violence, the convulsive reaction lacking depth and direction. But demagogues like Mussolini and Hitler, exploiters of the immaturity of youth, consciously incorporated such capers into their propaganda structure, aggravating the danger of such writers’ irresponsibility. Marinetti threw about wild “words.” A papery literary man, he ended up in Mussolini’s fascist academy, as a show horse for the sawdust Cæsar’s meager intellectual circus—with the serious writers either having left fascist Italy or having been put in jail, concentration camps or bestially slain.

But long before that, before the first world war, Marinetti had built up the futurist movement with young people, painters, sculptors, architects, musicians and writers. He was a first-class showman with a mad ambition to leave his mark in literary history. A millionaire with neither need nor desire to wait until reluctant publishers or the people accepted him, he published his own works. His formal achievements were full of surprise; his imaginative wit and fantasy were provocative. But the more his ambition developed into a theatrical cæsaromania similar to that of D’Annunzio, the “liberator of Fiume,” the less remained of the original fireworks of his thought. His vitality was transformed into technical facility. This is the key to his contradictory roles: the literary rebel and the political fascist—synthetized into a superbly gifted clown.

It would be agreeable to believe that inventiveness is to be found only in the work of men who have a fundamental respect for the integrity of each man, who have a feeling of social responsibility. But Marinetti exemplifies the case that a misinterpretation, or a malicious interpretation, of the storm signs of an imminent social crisis can also instigate inventions in literary techniques. Such techniques do not necessarily have a one-way tendency. The Russian futurists, for example, among the best known, Mayakovsky, turned to Communism, while James Joyce used “liberated words” independent of any political affiliation or even connotation.

Futurism—its literary form mainly derived from Apollinaire—acted as a mighty stimulus through its numerous “technical manifestos” which incited individual rebels everywhere to use their own means of expression with greater freedom. Its undigested political ideas, however, which around 1910 had not yet been made repugnant by the dismal reality of fascism, did not affect the artists who followed the literary pattern of futurism.

Here is one of the technical manifestos on literature by Marinetti, published in 1912, and distributed as a leaflet on street corners:

"the geometrical and mechanical splendor" •

"We have already behind us the grotesque burial of 'passeist' Beauty (romantic, symbolic, decadent) which had as essential elements the Femme Fatale and moonlight, souvenirs, nostalgia, eternity, immortality, the mists of legend produced by the vastness of time, the exotic charm produced by the spatial distances, the picturesque, the unprecise, love of the countryside, the solitude of the wilderness, multicolored disorder, the light of dusk, corrosion, patina—the dregs of time, the dilapidation of ruins, erudition, the smell of mildew, the taste of rotten pessimism, phthisis, suicide, the coquetteries of agony, the esthetics of failure, the adoration of death.

We disengage ourselves today from the chaos of new sensitivities of a new beauty for which we try at first to substitute and which I called the geometrical and mechanical splendor. It has for its elements the sun relit by the will, healthful forgetfulness, hope, desire, the perishable, ephemeral, controlled force, speed, light, will, order, discipline, method, the instinct of man multiplied by the motor, the feeling of the great town, aggressive optimism obtained by physical culture and sport, the intelligent woman (pleasure, fecundity, business), imagination with no strings attached, ubiquity, conciseness and simultaneity which characterize touring, big business and journalism, passion for success, the record, enthusiastic imitation of electricity and machine, the essential efficiency and the synthesis, the beneficial precision of cog wheels and lubricated thoughts, the competition of converging energies into one sense of action.

(1) We destroy systematically the literary ego so that it scatters itself in the universal vibration; we express the infinitely

small and molecular movements. The poetry of cosmic forces takes the place of human poetry. We abolish, therefore, the old proportions (romantic, sentimental, Christian) of the story as a consequence of a wounded man in a battle had an importance greatly exaggerated compared to the destructive engines, strategic positions and atmospheric conditions.

(2) I have often demonstrated that the substantive, worn out by the multiple contrasts and by the weight of classical and decadent adjectives, can be brought back to its absolute values by stripping it of all adjectives and by isolating it. I distinguish two types of stripped substantives: the elementary substantive and the substantive of synthesis-movement.

(3) Save for the necessity of contrasts and change of rhythms, the different forms of the verb should be eliminated, the infinitive is the very movement of the new lyricism.

(4) Use of isolated adjectives in parenthesis will give the atmosphere of the story. These adjective-atmospheres or adjective-tones cannot be replaced by substantives.

(5) Syntax contained always a scientific and photographic perspective absolutely contrary to the laws of emotion. In the liberated words this photographic perspective disappears; we obtain emotional perspective which is multi-form.

(6) In the liberated words we form sometimes synoptique tables of lyrical values which permit us to follow simultaneously several currents of crossing or parallel sensation in reading.

(7) The free expressive orthography and typography are used to express the facial expressions and gestures of the reciter.

(8) Use of onomatopoeia (a) direct onomatopoeia, imitative, elementary, realistic."

The sentences of this manifesto are a clever combination of the demands expressed consciously and subconsciously since the middle of the 19th century. They constitute something like a super-realism; realism of the macroscopic and microscopic photography and the slow and quick motion technique of the cinema.

One should not be misled by the unusual form or typography found in much futurist literature. There is nothing obscure in it. It is bare of all mystery and metaphysics. The futurist poem is an exact description of facts, actions and events in stenographic compression. "Zang-tumb-tu-uumb" (a poem about a battle), by Marinetti (1912) is typical although—after the terrible experiences of two world wars—it is rather depressing to see that someone can look at war so detached as from a box seat.

"Every five seconds space is split by the cannons of assault with a chord, ZANG-TUMB-TU-UUMB, an uprising of 500 echoes to grasp it, chop it and shatter it in the infinite. The center of this ZANG TUMB TU UUMB, fifty miles square, is cut by jagged explosions, punches, batteries of firing guns, quick violence, ferocity, regularly descending to this shallow grave, the strange crazy agitation piercing sounds of the battle, fury, preoccupation, open ears, eyes and nostrils.

Attention! Assault! What joy to see, hear, smell everything, everything taratatata of the machine guns, to lose your breath screaming from bites, slaps, traak-traak, whippings, pic-pac-pum-tumb, the shooting reaching bizarre heights of 200 meters, down down at the bottom of the orchestra, splashing in puddles, oxen, buffalo, wagons, pluff plaff, stampeding of horses, flic flac zing zing sciaaack ilari nitriti iiiiii, trotting, tinkling, three Bulgarian battalions marching croooc-craaac (slow) Sciumi Maritza o Karva-

• The somewhat changed version used here is from the book "Les Mots en Liberté Futuristes," by F. T. Marinetti (Milan, 1919).

vena ZANG TUMB TU UUMB toctoctooc (very rapid) crooooc-craaac (slow) commands of officers, clattering like brass plates, bread of qua paak there buumb cing ciak (fast) ciaciacia-ciaciak up down there around upstairs attention, on your head ciaak beautiful! Haze haze haze haze haze . . . haze comes down from the fortresses up there behind the river Sciukri Pascia, communicates by telephone with 27 fortresses in Turkish, in German, Hello! Ibrahim! Rudolph! hello! hello! actors' roles, echoes are prompters, sceneries of smoke, woods give applause, smell of hay, mud, I don't feel my frozen feet any longer, smell of saltpetre, smell of decay, timpani, flutes, clarinets, everywhere low and high, birds chirping, blessed shadows cipcicip green

breeze, herds don-dan-don-din-bee orchestra . . . the madmen beat the conductors of the orchestra, the conductors are very much beaten—play play do not cancel great noises, precise, clipped, lower the racket, very tiny rebounding of echoes in 300 miles square theatre, rivers Maritza Tungia, extended Rodopi mountains, straight ranges, boxseats and stalls, 2000 shrapnels exploding, dazzling white handkerchiefs full of gold srrrrrrr TUMB TUMB 2000 granades extended, grabbing crashingly very black hair, ZANG—srrrrr TUMB ZANG TUMB TUUMB the orchestra of noises of war blotted out under a note of silence held in the high sky by gilded spheric balloons which watch the shooting."

Futurist poetry, according to its followers, is an uninterrupted spontaneous current of analogies, the substance of each intuitively abbreviated in its essential form. Marinetti added a great number of new elements to contemporary poetry: sound effects; verbalization of sound and sight correspondences; sound collage, etc. An acoustic collage (onomatopoeia) adapting the visual technique of the cubist collages and the simultaneity of Apollinaire is shown best in his "Après la Marne, Joffre Visite La Front en Auto."

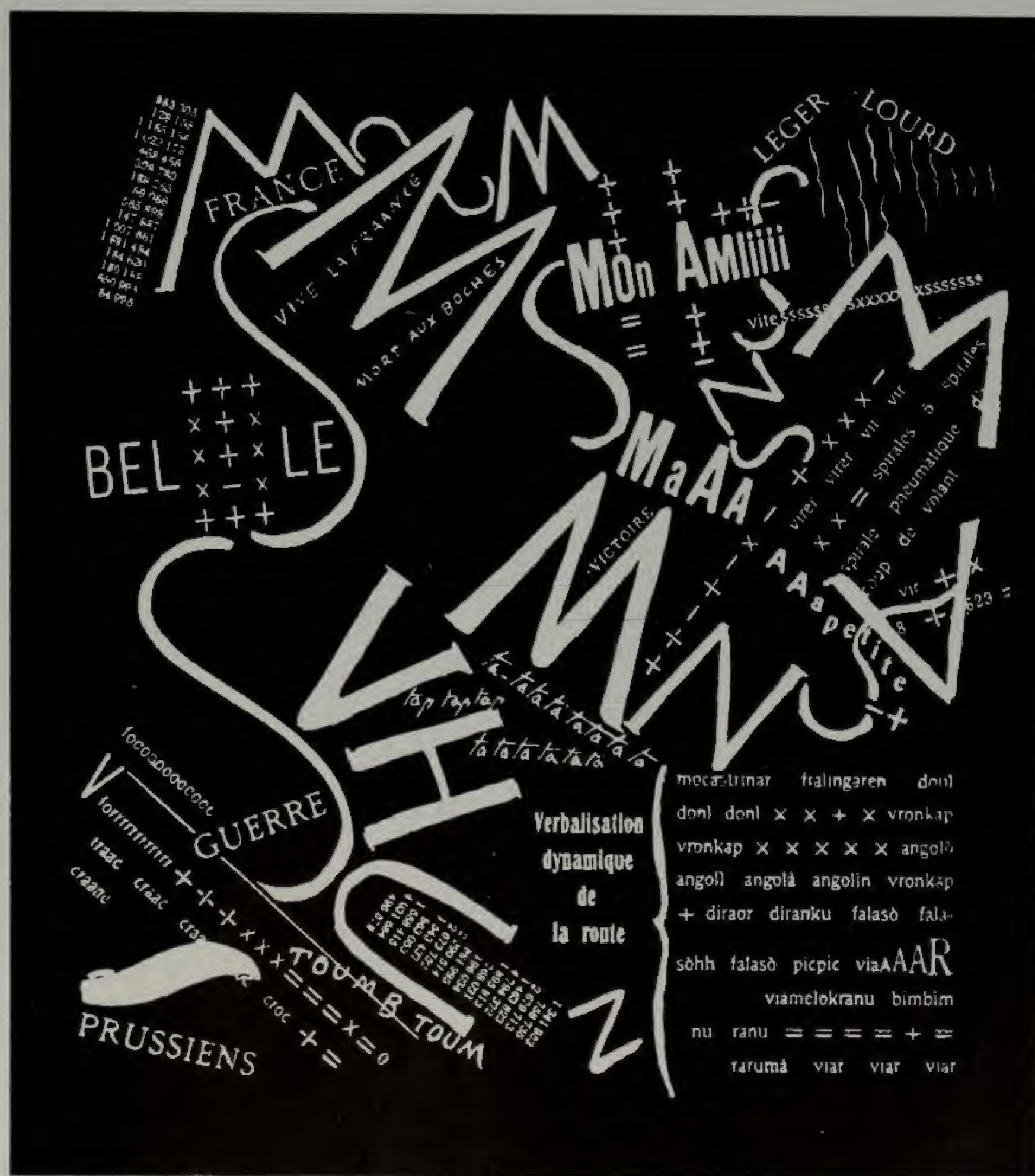


Fig. 395. Page from the book by Marinetti, "Les mots en liberté", 1919
Typographic rendering of the tumultuous speech by Marshal Joffre to his troops at the front, as well as the dynamic verbalization of his route through the battle zone

the new typography

As in every field where technology and mass production killed the quality of craftsmanship, so in typography and book production the introduction of the typesetting machines, the rotary press and other technological improvements, destroyed the fine quality of the illuminated manuscript and handset type. However, there were a few men who, unlike Ruskin and Morris, did not believe that the new technology had to be eliminated in order to save quality. They realized that with the machine age we were also on the threshold of a new typography and a new art of bookmaking and they were willing to experiment with the new means.*

The new technology of visual communication, which includes typography, illustration, photography, motion pictures and television, came with such rapidity that man could not keep pace with it.

This discrepancy between technology and design development is appalling. We may imagine for example that during the war some printing offices were equipped with teletype machines which, without being touched by human hands, automatically recorded messages from every battlefield of the globe. Within a few hours these reports were then compiled into large printed volumes and dispatched to every part of the world. But there exists as yet no organizational standard to produce the adequate form for a task of such speed and magnitude; one which would allow the sorting of this material into a coherent whole, comprehensible at a glance. There is as yet no balanced relationship of the elements involved, that is, text, illustrations, index, statistics, which would make possible the quickest and most profitable handling of many such volumes simultaneously should comparisons, statistical data or computations be quickly required.

Fortunately, the tremendous demands of business advertising have forced the typographer as well as the commercial artist to some imaginative solutions which can be understood as a successful preparation for the complex task of new communication. The new book production, which has to be understood on the scale of a library rather than a single volume, must and will utilize the pertinent findings of publicity and propaganda where the communication has to be measured in terms of economical effectiveness. Catalogs of merchandise, illustrated advertising, posters on billboards, front pages of tabloid newspapers, move towards inventive visual articulation. But first the elements of the new technology of printing and graphic arts had to be understood, so that they could be used with clarity and security. Apollinaire's ideograms and Marinetti's poems served, perhaps, not so much as models, but as tradition-breakers which freed experimenters to create a quick, simultaneous communication of several messages. The start caused quite an explosion, a seemingly purposeless, wild typography. But this "wildness" had a system in it—the system of contrasts.

• Many years ago I suggested "photoprinting" by x-ray. This would enable the production of thousands of sheets at once on photo-sensitized paper with the help of a well and carefully designed master-"negative."

Fig. 396. F. T. Marinetti, 1919

Page from the book "Les mots en liberté"
Adopting the ideogram, the "calligrammes"
of Apollinaire, the futurists used typog-
raphy as a dynamic, expressive com-
munication and as a means for quick
perception

On this page Marinetti attempts to show typographically the sweetheart reading a letter from her soldier friend who describes his dangerous experiences in the trenches. These experiences, though accumulated over a period of time, can be seen here simultaneously



THE
Numb. XLIII.
Pennsylvania GAZETTE.

Containing the freshest Advices Foreign and Domestick.

From Thursday, October 16. to Thursday, October 23. 1729.

THE Publishers of this Paper meeting with considerable Encouragement, are determined to continue it; and to that End have taken Measures to settle a general Correspondence, and procure the best and earliest Intelligence from all Parts. We shall from time to time have all the noted Publick Prints from Great Britain, New-England, New-York, Maryland and Jamaica, besides what News may be collected from private Letters and Informations; and we doubt not of continuing to give our Customers all the Satisfaction they expect from a Performance of this Nature.

From this Time forward, instead of publishing a Whole Sheet once a Week, as the first Undertaker engag'd to do in his Proposals, we shall publish a Half Sheet twice a Week, which amounts to the same Thing; only we think it will be more acceptable to our Readers, inasmuch as their Entertainment will by this Means become more frequent. Numb. XLIV. will come out on Monday next.

FOREIGN AFFAIRS.

At present the Foreign News of most Consequence to us seems to be that which relates to the Peace with Spain. The four following Paragraphs concerning it, are taken from four different London Papers, of the latest Date that came in the last Vessel from thence to Philadelphia. The two first are from the *London Journal* and the *British Journal*, both at this time accounted Government Papers; the third is from the *Craftsman*, who is suppos'd to be a Whigg Writer, but against the present Administration; the fourth is from *Fog's Journal*, (the same that was formerly called *Mist's Journal*) always reckoned a Tory Paper. When the Reader has allowed for these Distinctions, he will be better able to form his Judgment on the Affair.

From the *London Journal*, Aug. 16.
Paris, August 14. At last an Express is arrived here from Port St. Mary's, with the agreeable News, that on the 26th past the King of Spain signed an Order for the Delivery of the Effects of the Galleons, the Indulto being settled at 15 per Cent. and those of the Assogues Ships at 5 per Cent. His Majesty had likewise ordered Passports to be made out for the English South-Sea Company upon the ancient Foot, and to put every thing in the West-Indies in the

same State as before the Arrival of the English Squadron in those Parts. The Distribution of the Effects is to begin the 15th or 16th Instant; and the Flota for New Spain will depart from Cadiz a few Days before, under Convoy of three Men of War commanded by the Marquis Mari.

From the *British Journal*, Aug. 16.
Extract of a Letter from Port St. Mary's, Aug. 2.
The 28th past, a Grand Conference was held at the House of the Marquis de la Paz, the Ministers of France, Great Britain and Holland being present: The principal Articles relating to the Peace being agreed on, upon breaking up the Conference, the King gave Orders for the immediate Distribution of the Effects of the Galleons, and that all things should be re-establish'd in the West-Indies, as they were before the Appearance of the English Fleet at Portobello. The Peace will be concluded in the following manner, viz. A Truce for 14 Years between Spain and England, in which Time the justest Measures shall be taken to terminate all Differences; and that Spain shall be suffer'd to send 12000 Men into Italy, to secure Tuscany to Don Carlos.

From the *Craftsman*, Aug. 16.
Since our last, We have had some Account of the Treaty, which hath been so much talk'd of, communicated to us by Authority; I mean in the *Gazette* of Saturday last, which says, "that on the fifth Instant arrived here Mr. Sharpe, one of his Majesty's Messengers from Madrid, but left from Paris, with Letters from Mr. Keene, his Majesty's Minister at the Court of Spain, dated at Port St. Mary's the 2d of August, N.S. inclosing the Draught of a Treaty for adjusting Matters between the Allies of Hanover and the Crown of Spain, as it had been concerted between the Ministers of the Allies and those of that Crown, which is sent to the Courts of England and France, and to the States-General for their Approbation. In the mean Time the King of Spain's Orders were issued on the 25th of July, N.S. for the delivering out the Effects brought from the West-Indies on board the Galleons to their respective Proprietors; and the Cedula's, desired by Mr. Keene in Behalf of the South-Sea Company, were to be given in eight Days, from the Date of Mr. Keene's Letter, which Time it would require to prepare and pass them thro' the several Offices.

Whether this Draught contains an absolute Treaty of Peace, or only a Provisional Treaty, like that which was projected last Winter, we cannot yet learn, but expect to be speedily informed from the same Authority.

From *Fog's Journal*, Aug. 16.
From Port St. Mary's we are assured, that the King of Spain's Order is certainly issued out for delivering to the Proprietors the Effects brought by the Galleons, which is said to be owing to certain Spaniards, who represented to his Majesty, that many of the Merchandizes were perishable, and that the Owners must suffer great Losses if they were kept longer. — But we do not find that the Treasury is included in this Order. — There is no Talk at present of any more Marriages in Prussia, as it was to be hop'd, because there are other Commodities never the better for keeping, besides those brought by the Galleons.

Th:



Fig. 397. Newspaper, 1729

In the same way as today many events are reported, but no great help is given to the reader for their quick grasp

Fig. 398. The Chicago Sun, 1945

The modern newspaper, especially one which depends upon street sale, tries to organize the many events of the day similarly as the futurists: the reader should read all the news almost at once. For his 31 messages shown on this page, the editor tried to find an organized layout form by using different foundry types, sizes and characters, different lengths of lines and columns, photographs and drawings

The history of printing saw a degeneration of the rich contrastful incunabula, with colored initials and large letters, into the flat gray page of small types without any consideration of visual fundamentals. The ideograms of Apollinaire were a logical answer to this dull typography, to the levelling effects of the gray, inarticulate machine typesetting. He not only printed the words, but through the emphasis of position and size differentiation of the letters, he tried to make them almost "audible."

The futurists and dadaists continued these efforts by giving up the rigid horizontal order of typesetting and employing typographical material as a flexible element in pictorial composition. In contrast, the constructivists emphasized the functional role of typography. In Lissitzky's book on Mayakovsky's poetry, a tab-index of signs, a kind of typographical shorthand, symbolized title and content of the poems, especially useful at mass meetings when the elocutionist had to quickly thumb through the volume for a poem called for by the audience. Such forceful use of the typographical elements soon degenerated into decorative patterns as they were taken over more and more by thoughtless newspaper advertising where each little ad tried to overpower the others. The result was a visual chaos that could be remedied only by a return to the fundamentals of the new typography, that is, simplicity and forcefulness through the simultaneous organization of the numerous messages which have to be transmitted to the reader. Newspapers—especially in the presentation of the heterogeneous news on the front page—unconsciously achieved a simultaneous quality of type and illustration. But congestion is the enemy of organization, so simultaneity had to be brought to a greater refinement. Here, magazines and trade papers led the way.

With the further development of photoengraving techniques, a great number of other visual manipulations, such as superimpositions and photomontage, have been added to the dictionary of visual communications, the typographic counterpart of vision in motion. From such practices grew the attempts to change typography from typesetting to photo engraving by fusing into a "collage" all the elements, that is, the copy, drawings, photographs, facsimile of documents, scripts, etc. Textures, along with cutouts and foldings, were later added to the printed matter to vitalize the reception range of the eye. Another attempt at inducing a quick grasp was establishing visual continuity of the successive pages through the whole book. Mail order catalogs, children's books, leaflets, Christmas cards, invitations, show this development and there seems to be no limitation to the variation of means. Although most of these devices are used mainly in advertising layouts it can be safely predicted that soon they will form the normal routine of every type of communication from scientific to philosophical discourse.

●

Already in Marinetti's Joffre poem, movement, space, time, visual and audible sensations were simultaneously expressed by the typography. (This typography was the

Fig. 401. Paul Rand, 1938

Title page of an advertising leaflet (montage)

The advertising artist helps to popularize the language of the new vision. Here the principles of the "collage" and the "photomontage" are utilized with wit and skill

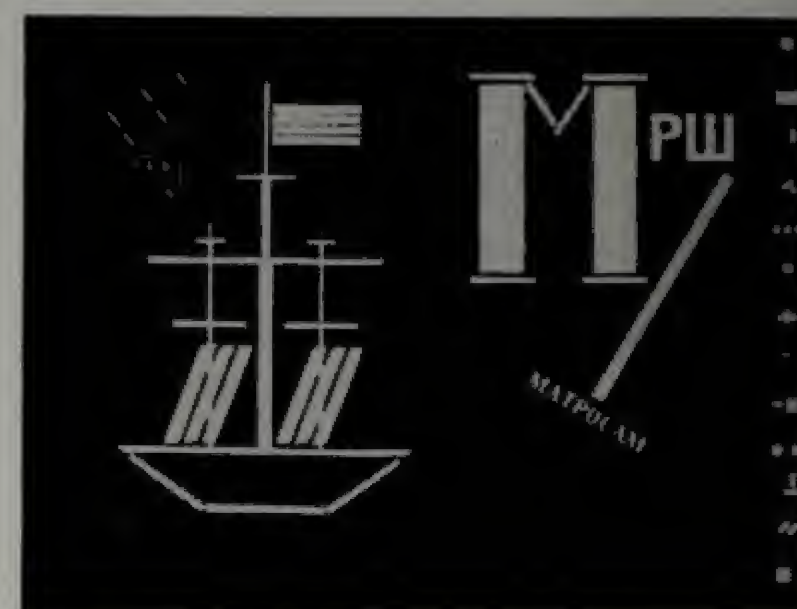


Fig. 399. El Lissitzki, 1924

Double page from the book of poems by Mayakovsky

The little signs (tabs) on the right indicate the index for the thirteen poems which the elocutionist at mass meetings used when the audience demanded the recital of a popular poem

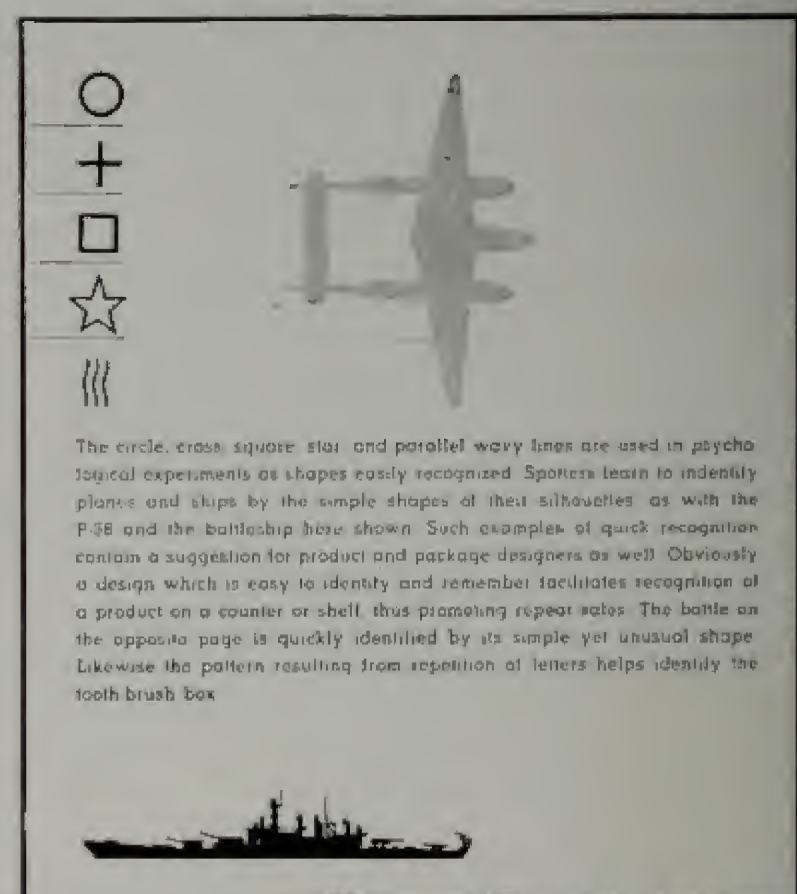


Fig. 400. L. Sutnar, 1944

Advertising

Fig. 402. Herbert Bayer, 1939

Advertising



Fig. 403. Xanti Schawinski, 1932
Poster

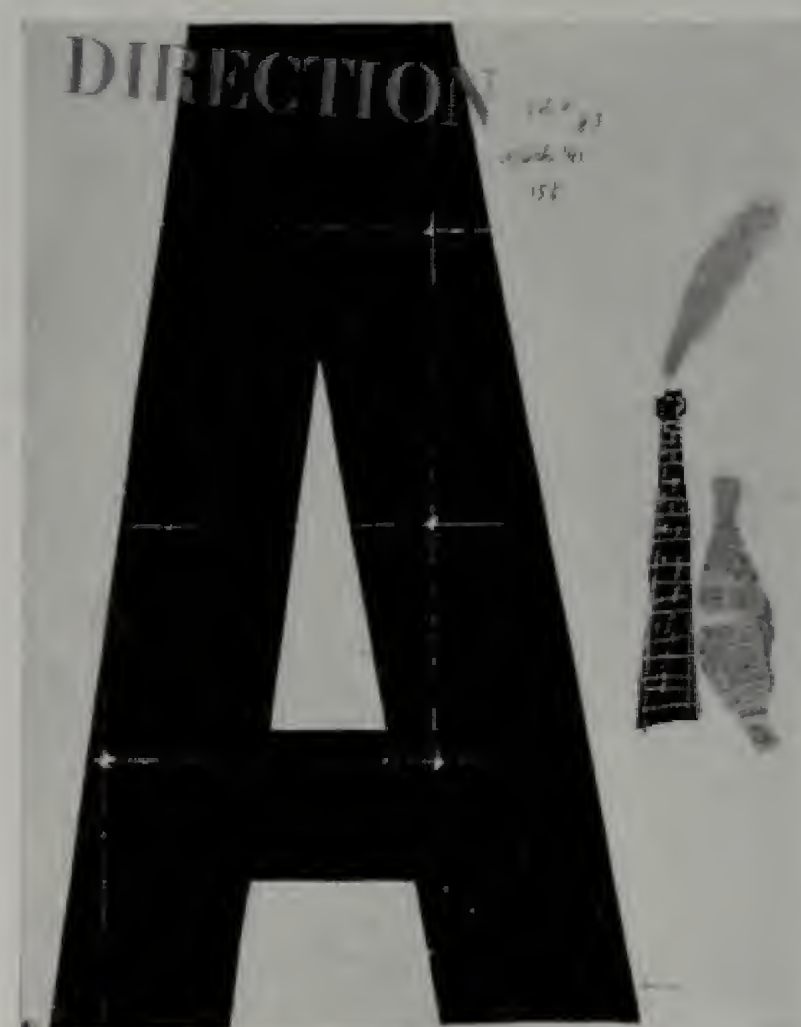


Fig. 404. Paul Rand, 1941
Title page of a magazine
The rigid use of the traditional horizontal and vertical typography has been now discarded in favor of an oblique composition mixed with drawings, photographs, facsimile handwriting, derived from the collage and photomontage, easily reproduced by the photo-engraving techniques

direct predecessor of the newspaper front page.) One sees the curves which the motor car followed, the "dynamic verbalization" of the route of Joffre in the lower right hand corner. The general's conventional speech to the soldiers is translated into the typography. His words are torn to pieces by the accompanying noise of machine guns and cannons. A large number of soldiers is represented by the logarithm column in the upper left; they echo the general's shouting "Vive la France!" "Mort au Boches!"

Rimbaud

Arthur Rimbaud with his poem "Vowels" and in the "Alchemy of the Verb" (1873) • emphasized the "verbalization" of emotional currents, basing his work on the interchangeability of different sensory experiences.

"I invented the color of vowels!—A, black; E, white; I, red; O, blue; U, green—I controlled the form and movement of each consonant, and flattered myself that, with instinctive rhythm, I might invent some day or other, a poetic verb accessible to all five senses. I reserved the right of translation. At first, it was an experiment. I wrote silences. Nights. I took notes of the inexpressible. I transfixed vertigos."

(See the photograph of fragrance on page 182)

The interchangeability—not only correspondence—of the sensory experience is a scientific reality today. We can see odors since fragrances can be photographed. With the photo cell one can change visibility into audibility and vice versa, as in the sound film. One may invent, for example, an apparatus which registers the change of the traffic lights in sound for the color blind, or an apparatus with which the blind can hear what healthy eyes can see.

dadaism

The dadaists influenced by the futurists, and the surrealists influenced by the dadaists, both claimed Rimbaud as one of their ancestors. They opened up the route for the surprising, embarrassing and even the "nonsensical." The futurists were propagandists of movement, speed, dynamism; rhapsodists of technology. With infantile enthusiasm they hailed war as a "health giver" merely because it was dynamic, full of movement and speed. Fortunately, not everywhere did the youth believe in this thesis. Some faint idea prevailed amongst a great number of them that there was a lag between the technological accomplishments and the social reality and that the greatest single need of the age was the bridging of the gap.

Indeed, many achievements of the industrial revolution could be praised emphatically if people had not had to pay so dearly for them. The price—a progressive diminishing ability to judge biological and social needs—was unreasonable. The industrial

- Shakespeare offers good examples of the rich compounding of visual experience with the power of the word:
- "the multitudinous seas incarnadine, making the green one red" (*Lady Macbeth in "Macbeth"*)
- "This bank and shoal of time" (*Hamlet*)

revolution decisively changed public and private morals, but this was not yet officially acknowledged. People acted according to the new necessities, but because their actions often did not fit into the old moral code they tried to dodge a full awareness of the motivations. This resulted in hypocrisy. No one knew any more what was good for him and still less what was damaging. The individual crippled or entirely lost his sense of discrimination for human values which would have given purpose and sense to life and coherence to society. These conditions deteriorated more and more. In 1914 the explosion came.

"Dadaism was born in the Cabaret Voltaire in 1916. Among Hugo Ball's intimate collaborators, besides his wife, Emmy Hennings, and myself, were Hans Arp, and the Roumanians, Tristan Tzara and Marcel Janco. Our work in the Cabaret Voltaire had, from the very beginning, an antimilitaristic, revolutionary tendency. Friends came to visit from the various belligerent countries—from Italy, the futurists; from Paris, Picabia; from Germany, Rene Schickele and Werfel. All of them, even the futurists, loathed the senseless, systematic massacre of modern warfare.

"We were not politicians, but artists searching for an expression that would correspond to our demands for a new art. All of us were enemies of the old rationalistic, bourgeois art which

we regarded as symptomatic of a culture about to crumble with the war. . . . Our art had to be young, it had to be new, it had to integrate all the experimental tendencies of the futurists and cubists. Above everything, our art had to be international, for we believed in an Internationale of the Spirit and not in different national concepts. . . ."

"Dada is forever the enemy of that comfortable Sunday Art which is supposed to uplift man, by reminding him of agreeable moments. Dada hurts. Dada does not jest, for the reason it was experienced by revolutionary men and not by philistines who demand that art be a decoration for the mendacity of their own emotions. . . ." •

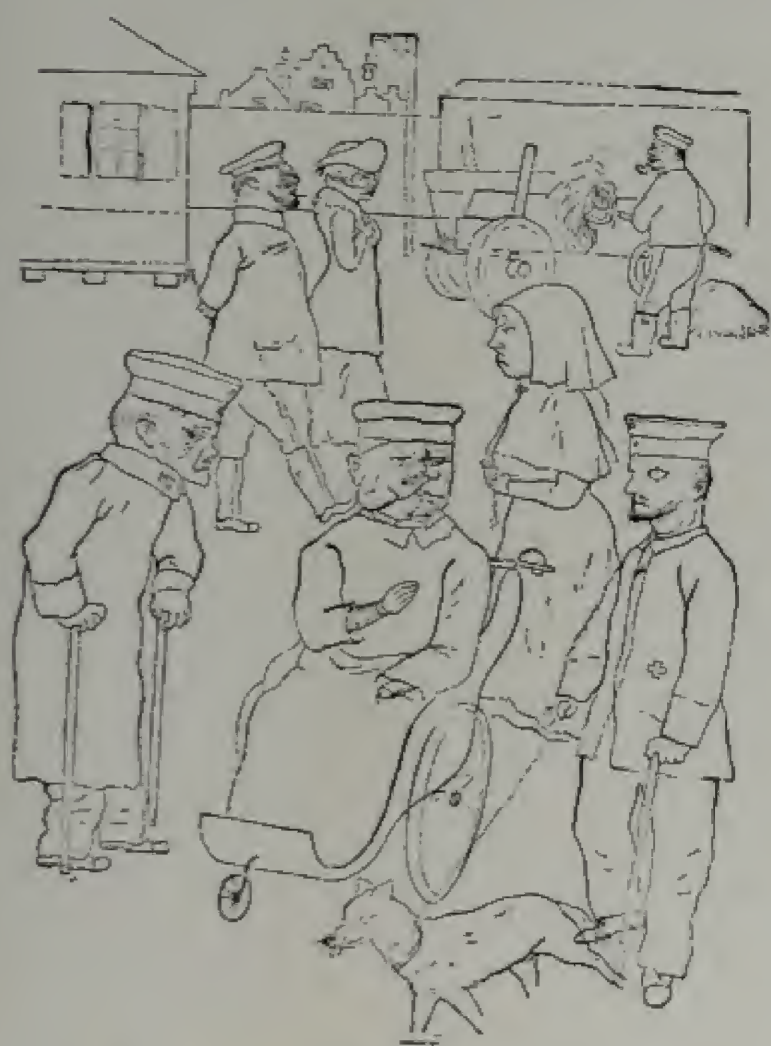


Fig. 405. George Grosz, 1920
German "landscape"
This drawing is from his bitter dadaistic period

In the "Cabaret Voltaire," Zurich (1916), some young emigrants started out with performances full of bitterness against the "imperialistic" war. They were refugees from Middle European countries and wanted nothing but revenge, to slap the face of the bourgeoisie responsible for the massacre. Huelsenbeck said, "I wanted to make literature with a revolver in my pocket." The statement echoed in many a young man's mind everywhere conditioned by the violent language of Marinetti. There was a difference, however. Futurism glorified the growing Italian imperialism while dadaism—visualizing the social responsibility of everyone living—fought by ridicule the same imperialistic trend of World War I. Common to both was the tactic: "épater le bourgeois" (bluff the burgher).

The dadaists were most inventive in annoying their public. They tried to destroy traditional beliefs, to make a farce of everything which was considered worthy. They spared their audience neither physical nor psychological pain. After singing chansons against the vices of the bourgeois, they formed choirs with noisy cacophonies, imitations of the aboriginal negro chants. They admired the action-saturated futurists who, with their contempt for every code, did not shrink from hand to hand fights with their audience. Their attacks generally took the form of futuristic poems. Tzara wrote a play, "The Gas Heart." In the foreword he explained that the play did not contain anything "extraordinary"; it followed the classical rules. Further reading disclosed that the players were Ear, Eye, Eyebrow, Nose, Mouth and Neck around a gas-heated Heart.

• From "Dada lives," by Richard Huelsenbeck, August, 1916; translated by Eugene Jolas, "transition" No. 25.

"... I remember the mysterious haste which possessed you
after the passing of a train
massive chains moved blackly inside heads
cocks raised frugal crows between each pair of looks
and the winds wiped the all fresh barkings off the moist
muzzles
they went and burst far away where memory was no more
they burst in a crash of light noiselessly. . ."

"... I have seen its body and I have lived on its light
its body writhed in all the rooms

offering up unseated gods to blind adolescences
and heaps of children turned into locusts on immense
desolate beaches
fetlocks yelping with a savage joy
branches-babbling in the fragile rills
I saw its body stretched from end to end
and I plunged myself into its light which went from
room to room
the whipping tree lacing with thin weals of gloom
the immensely tortured body. . ."

by Tristan Tzara, from "The Approximate Man" in Julien Levy's "Surrealism,"
(Black Sun Press, New York, 1936)

Dadaistic poems often appear "nonsensical" but not all nonsense is Dada; as for example:

"Question: If it takes a gallon of molasses to make a bushel of potatoes, how much cheese cloth does it take to make an elephant a shirt waist?

"Answer: Remember on a dark and stormy night, your mother is your best friend." Or: "Why is a mouse when it spins?" Answer: "The higher the fewer."

"What is it that you can put up a down-spout down or down a

down-spout down but which you can put neither up nor down a down-spout up?"

Answer: "An umbrella!"

"West wind is blind—wind is zephyr—Zephyr is yarn—yarn is tail—tail's attachment—Attachment is love—love is blind—therefore West wind is blind."

This type of folklore nonsense, produced for amusement, is not comparable to the utterances of the dadaists. This type of joke is "decorative," a "nonsense varnished with the charms of sounds."[•] But the dadaists' humor is the gallows humor of the condemned. Their "nonsense" designates a deep purpose. To be sure, they did not work with correct grammar or formal language. The flow and continuity of their poems was built upon the perceptive effects of the words and their manifold socio-biological, psychophysical connotations, irrespective of conventional reference or structure. To read such writing is a rather aggravating task for the novice but very rewarding in the long run. The combination of verbs and nouns, words and sentences without the customary perspicuity of the normal syntax in a poem, brings a fresh breeze into the dull construction of the language. Unexpectedly, one is allowed to follow the word freely into a fresher grammar of emotional communication. Such poems lead back simultaneously to the primordial elements of the language and in some combinations to the utmost utilization of education through associative interpretation, ingenuity and fantasy. It is in the power of the listener to weave this multitude of connotations into a substantial pattern.

• Charles Churchill.

The poetry of Dada, perhaps for the first time in literary history, calls for *active participation* instead of passive appreciation; not taking the world as the best possible of all existing worlds but having the courage to change it.

Jean Arp

Jean Arp, an Alsatian painter, sculptor and writer, reminds one of Christian Morgenstern, whose "Songs of the Gallows," were published in 1905. In fact, Arp's poetry is a deeper justification of Morgenstern's importance and prophetic foresight than the ironic estimation of Morgenstern's contemporaries who put him in the category of witty but petty humorists.

Arp is the least spectacular of the dadaists but probably the deepest; an earnest craftsman, unruffled even in his most "scurrilous" antics. His poetry is always at the edge of a precipice, between the well known and the never dreamed. His word twistings are full of inferences though seemingly only the details are of comprehensible content; but the elusive "reality" of that dream world is worthy of being analyzed by a coming generation. Already with the passing years his contemporaries see, hear and understand him better.

*From the "Pyramid Frock" by Jean Arp
(translated by S. D. Peech)*

*"That I as I
am one and two
That I as I
am three and four.*

*That I as I
standing falls she
That I as I
If she goes she*

*That I as I
how much shows it
That I as I
tick and tack it.*

*That I as I
nine and ten is
That I as I
nine and ten is
That I as I
eleven and twelve is."*

*That I as I
five and six is
That I as I
seven and eight is.*

*"The Skeleton of the Day" by Jean Arp
(translated by Eugene Jolas, "transition" No. 26, 1927)*

1
*the eyes talk together like flames on billows
the eyes want to walk out of the days
the flames have no names
each flame has five fingers
the hands stroke the wings in the sky*

2
*the lips rise out of the words
like beauty out of the billows of the sky
beauty is shut in by light
as the bell is by kisses*

3

but what will take its place
from the top of the table tumble the wings
like leaves out of the earth
before the lips
in the wings there is night
and between them we miss the singing chains
the skeleton of the light empties the fruits
the body of the kisses will never waken
it was never real
the sea of the wings rocks this tear
the bell talks with the head
and the fingers lead us through the fields of the air
to the nests of the eyes
there the names pass away
but what will take their place
in the summit of the sky
neither sleep nor waking
for the graves are lighter than the days

4

a singing sky arches over the heart
yet we must not believe its songs
hopelessly thrive the fruits
the eyes look weeping
at the edges of the days
the days are only wounds
the lips kiss into the void
the sun looses his leaves
the leaves cover the eyes
the light is hollow
the pasture of the wings is covered with ashes

10

the eyes are wreaths out of earth
the voices reach only from one leaf to the other leaf
when the eyes melt the light ripens
and falls like a bell into the beautiful season
and the nests also ring in the summit of the sky

Traditional poetry displayed the old content. Its form of expression—the one dimensional linear form—was adequate for the ideas formulated. Today a profoundly changed content has to be expressed, precipitated by the industrial revolution with its new social structure and all its ramifications. At present there are no adequate words, symbols, signs—the much needed structure of communication.[•] One has to be satisfied today with the search.

Lautréamont, Rimbaud and the symbolists started to introduce new words.^{••} The expressionists discovered new dimensions of feeling; Apollinaire and the futurists interchanged sensory experiences in order to enlarge the range of reception; and the dadaists proved that emotional traits are never describable, only recordable in the making, like functions of the organism, metabolism or breathing. So they came to a new device of the literary expression—to a crisscrossing, zigzagging thought-pulsation of as many currents and messages as could be transmitted at the same time. We have an analogy in the synchronous multiplex telegraphy and in the co-axial telephone cable system which handles four hundred simultaneous telephone conversations without “cross talks.”

The dadaists produced a remarkable paradox. Although they revolted against traditional values and their work was seemingly destructive, their negation grew into a new departure for a future literary development. For the first time in literature a group of individuals consciously agreed upon the “nonsensical” as their leading theme. But this nonsensical was only the beginning. Very soon a genuinely individual



• T. S. Eliot says in his Four Quartets:

“For last year’s words belong to last year’s language;
And next year’s words await another voice.”

•• Amedée Ozenfant made an interesting study of them in his book, “Foundations of Modern Art,” 1932, (Harcourt, Brace and Co.)



Fig. 406 a, b. The constructivist-dadaist congress in Weimar, 1922

The constructivists living in Germany (Theo van Doesburg (1), El Lissitzki (7), Max Burchartz (6), Cornelius van Eesteren (8), Alfred Kemeny (9), Hans Richter (5) and myself (11), called a congress in October of 1922, in Weimar

Arriving there, to our great amazement we found also the dadaists, Hans Arp (4) and Tristan Tzara (3). This caused a rebellion against the host, Doesburg, because at that time we felt in dadaism a destructive and obsolete force in comparison with the new outlook of the constructivists

Doesburg, a powerful personality, quieted the storm and the guests were accepted to the dismay of the younger, purist members who slowly withdrew and let the congress turn into a dadaistic performance. At that time, we did not realize that Doesburg himself was both a constructivist and dadaist writing Dada poems under the pen name of I. K. Bonset

(No. (2) is Mrs Nelly van Doesburg, No. (10) Lucia Moholy)

system began to work in these writings; an indescribable speed in catching emotional flashes; the opening of the hidden doors of simultaneous thinking and feeling; a roaming in a new landscape of the psyche. In this literature everything was related to a main motive which was not emphasized but only became evident through the loose relationships of single statements. These statements were like juxtaposed threads not even disclosing a faint texture. Quickly, without one's having been able to register its exact meaning, a mutation occurred: clearly, a fabric became comprehensible to the reader—in a very suggestive unconscious way, through the magic of the words, their affinities and modulations. This was the result of a new lyric expression, like an x-ray revelation, making transparent that which was previously opaque; a new structure and topography of the psychological existence, the rendering of psychological space-time.

Tristan Tzara

Speaking about poetry, one cannot fail to emphasize the development of literary form which helps shape the organic continuity of civilization. Dadaism is not an erratic outburst but a part of literary history which contributed a new variety to the existing lyrical idiom. Tristan Tzara's poetry shows this very clearly. He is amorphous and phosphorescent, very different from Arp who is like a solid, smooth crystal. Coming from Roumania which was proud to call Bucharest, "le petit Paris," Tzara had a nostalgia for France, and for French literature, which he knew better than any Frenchman. He wrote and thought in French like Marinetti, the Italian, like Guillaume Apollinaire, the Frenchman of Polish ancestry. All three admired French as the most crystallized of all languages. They mastered it impeccably, but their native idioms, with stronger metaphors, more flowery combinations, still rang in their ears. With these elements they—the "foreigners"—helped rejuvenate the literary language of France.

Tzara's indefatigable energy pushed Dada to the foreground. Supremely intelligent, he recognized the new weapon of this capitalistic age: publicity. This had helped Marinetti to secure his place among the Montparnasse artists. Tzara wanted such recognition for himself and was untiring in beating the dadaist drum. Starting a correspondence with all Europe, he tried to contact every contemporary artist who would help him to spread his gospel. He wrote poems, acted in plays, recited, lectured, published reviews, opened an art gallery. Slowly the success of Dada was secured. But he and other dadaists were not satisfied with their activities in Zurich. After the war a number of them left for Germany. They spoke up wherever they were allowed to talk. They held public meetings. Their performances were infuriating, the public was outraged. The performances of the dadaists, like those of the futurists in Italy, ended in real battles, in throwing bottles and rotten eggs.

Today, after 25 years, it seems clear that their literary activities played an important role in the emergence of a more imaginative, revitalized language; incorporating such different elements as typographical vagaries, dialects and slang. Gradually this approach, not always with Dada label, gained force and many followers. It broke through the Chinese wall of conventions, as in the case of Joyce's "Finnegans Wake," the genius of which is not denied by any earnest critic.

Hugo Ball. Richard Huelsenbeck

Among the Zurich dadaists there were a number of interesting figures, especially Hugo Ball and Richard Huelsenbeck.

Hugo Ball, the most scholarly of all the dadaists, had tried to air his disgust with the political tradition of Germany in a book: "Criticism of the German Intelligence." He blamed Martin Luther, the Protestant, the destroyer of mediæval transcendentalism, for the regimentation of the German mind, for militarism and even the first world war. But this acrid historical analysis was not enough to satisfy his hatred which was born from a helpless love for the stifled riches of German culture. To see

this wealth of religious and artistic creativeness exterminated by the hollow and ambiguous rationality of the state-machine, made Hugo Ball a dadaist, a preacher of the "nonsensical."

Sound Poems (Zurich, 1915)

by Hugo Ball.

"I invented a new species of verse: 'Verse Without Words,' or sound poems, in which the balancing of the vowels is gauged and distributed only according to the value of the initial line. The first of these I recited tonight. I had had a special costume designed for it. My legs were covered with a cothurnos of luminous blue cardboard, which reached up to my hips so that I looked like an obelisk. Above that I wore a huge cardboard collar that was scarlet inside and gold outside. This was fastened at the throat in such a manner that I was able to move it like wings by raising and dropping my elbows. In addition I wore a high top hat striped with white and blue. I recited the following:

gadji beri bimba
glandridi lauli lonni cadori
gadjama bim beri glassala
glandridi glassala tuffm i zimbrabim
blassa glassasa tuffm i zimbrambim. . . .

The accents became heavier, the expression increased with an intensification of the consonants. I soon noticed that my means of expression, (if I wanted to remain serious, which I did at any cost), was not adequate to the pomp of my stage-setting. I feared failure and so concentrated intensely. Standing to the right of the music, I recited "Labada's Chant to the Clouds"; then to the left, "The Elephant Caravan." Now I turned again to the lectern in the centre, beating industriously with my wings. The heavy vowel lines and slouching rhythm of the elephants had just permitted me to attain an ultimate climax. But how

(Translated from the German by Eugene Jolas)•

Fragments from a Dada Diary

"March 6, 1916—Introduce symmetries and rhythms instead of principles. Contradict the existing world orders. . . .

June 12, 1916—What we call Dada is a harlequinade made of nothingness in which all higher questions are involved, a gladiator's gesture, a play with shabby debris, an execution of postured morality and plentitude. . . .

The Dadaist loves the extraordinary, the absurd, even. He knows that life asserts itself in contradictions, and that his age, more

to end up? I now noticed that my voice, which seemed to have no other choice, had assumed the age-old cadence of the sacerdotal lamentation, like the chanting of the mass that wails through the Catholic churches of both the Occident and the Orient.

I don't know what inspired me to use this music, but I began to sing my vowel lines recitatively, in the style of the church, and I tried to remain not only serious but also to force myself to be grave. For a moment it seemed to me as if, in my cubistic mask, there emerged a pale, disturbed youth's face, that half-frightened, half-curious face of the ten-year-old lad hanging trembling and avid on the lips of the priest in the funeral masses and high masses of his parish. At that moment the electric light went out, as I had intended, and I was carried, moist with perspiration, like a magical bishop, into the abyss. Before the verses, I had read a few programmatic words:

With these sound poems we should renounce the language devastated and made impossible by journalism.

We should withdraw into the innermost alchemy of the word, and even surrender the word, in this way conserving for poetry its most sacred domain. We should stop making poems second-hand; we should no longer take over words (not even to speak of sentences) which we did not invent absolutely anew, for our own use. We should no longer be content to achieve poetic effects with means which, in the final analysis, are but the echoes of inspiration, or simply surreptitiously proffered arrangements of an opulence in cerebral and imagistic values."

than any preceding it, aims at the destruction of all generous impulses. Every kind of mask is therefore welcome to him, every play at hide and seek in which there is an inherent power of deception. The direct and the primitive appear to him in the midst of this huge anti-nature, as being the supernatural itself. . . . The bankruptcy of ideas having destroyed the concept of humanity to its very innermost strata, the instincts and hereditary backgrounds are now emerging pathologically. Since no art,

• From "Flucht aus der Zeit," Duncker and Humboldt, Munich published in English in "transition" No. 25, Fall, 1936.

politics or religious faith seems adequate to dam this torrent, there remain only the blague and the bleeding pose. . . .

. . . The image differentiates us. Through the image we comprehend. Whatever it may be—it is night—we hold the print of it in our hands.

The word and the image are one. Painting and composing poetry belong together. Christ is image and word. The word and the image are crucified. . . .

March 30, 1917—The new art is sympathetic because in an age

of total disruption it has conserved the will-to-the-image; because it is inclined to force the image, even though the means and parts be antagonistic. Convention triumphs in the moralistic evaluation of the parts and details; art cannot be concerned with this. It drives toward the in-dwelling, all-connecting life nerve; it is indifferent to external resistance. One might also say morals are withdrawn from convention, and utilized for the sole purpose of sharpening the senses of measure and weight. . . ."

(from "Flucht aus der Zeit" translated by Eugene Jolas "transition," No. 23)

After a few years of cooperation, Hugo Ball, the ascetic philosopher, disapproved of Tzara's strategy for literary glory and broke with him. Huelsenbeck acted somewhat similarly. He felt that Dada was not a literary and art movement, but "life" itself; life with all its contradictions and tricks, pleasures and betrayals. Leaving Zurich for Germany he formed a group of young artists around himself: Johannes Baader, George Gross, Raoul Hausman, Hannah Hoech and John Heartfield. They became more and more fascinated with the revolutionary struggle which developed into a dominant lifeform in the postwar Germany. The more these people were thrown into the revolutionary movement of the proletariat the more they lost their identity as dadaists. But this was their conscious policy of "artless" approach.

Huelsenbeck's poems "Phantastische Gebete" (Fantastic Prayers) are good documents of the time—somewhat similar to Whitman's "Respondez." But Huelsenbeck's bitter protests against the Kaiser, German militarism and bureaucracy were shot through with grotesque streaks of folly, and with the vulgar humor of a super-Villon. His pamphlet, "En Avant Dada! The History of Dadaism," (1921) gives a sober unsentimental survey of the movement. He shows there, better and more sincerely than is done in any other report, the unconscious innocent beginnings of the movement. However, he never grasped the real role of Tzara nor his poetic vein. He saw in him only a literary dandy, drunken with his selfmade fame.

One of Huelsenbeck's best friends, Raoul Hausman, had not been in Zurich when Dada began its work. Neither were Kurt Schwitters nor Max Ernst. But all of them opposed the obsolete setup which had been preserved from the Imperial Reich and was carried into the compromising German Republic. "In the dismal gray of a protestant despair we will open all the vents and let the electric fans furiously revolve in order to create an atmosphere for our contemporary ideas. . . . What is art? It is a nonsense when it gives us only esthetic rules to move with security between the geography of the metropolis and agriculture, the applepie and the women's bosom. . . . The new man should have the courage to be new," said Raoul Hausman in his "Presentism" (February 1921). Implicit in this "new" is the new social way of living—so distant at this moment yet so near if one will but realize the promises of the revolution which followed the war of 1914-18. Working at the periphery of the dadaist movement these three men at times expressed it better than the originators. This is especially true of Kurt Schwitters, the German painter and writer.



Fig. 407. Richard Huelsenbeck, 1922
The title page of the brochure "En avant dada" (history of the dadaism)
This page is typical of the attitude of the dadaists in producing tension a la tabloid newspapers and magazines. This page is full of sensational headlines, such as "Startling disclosures", "Practices of the child-farmers", "The abstract art", "Dada to be healed????", "The Kaiser, Hindenburg & Co.", "The feeding of the intellectuals at Potsdam Square", "Is Dada insane?", "The syphilis of Picabia", "How about a little drink?", and so on.



Kurt Schwitters

Opposition is needed in every society. Its functions are to check injustice and to inject fresh blood into anemic arteries. But opposition grows not only in the political arena. Dissatisfaction of various kinds may be instrumental in fostering opposition to the obsolete in any walk of life. The airing of grievances is a part of the social process of improvement which may flow into reforms or revolutions.

Schwitters published a poem "Anna Blossom Has Wheels" (*Anna Blume*) in 1919, which in a short time gained great popularity. At first reading the poem seems to be only doubletalk. In reality, it is a penetrating satire of obsolete love poems, exaggerating their silliness to fantastic dimensions. In "Anna Blossom" as in many other poems of Schwitters, the attitude "I oppose" or "I don't care" prevails. This is the first step of the dissatisfied who does not wish to be leashed to conformity and kept to heel by the threat of social boycott.

Fig. 408. Kurt Schwitters, 1922
Lithograph from the pamphlet "Die Kathedrale"
Published as Nos. 39-40 of the series, "Die Silbergaule", by Paul Steegmann Verlag, Hannover.

Fig. 409. Double page from Kurt Schwitters' book "Anna Blume"
(Published by Paul Steegmann in 1922). This poem became a popular kind of double talk in Germany in the twenties quoted even by people without literary interest.

ANN BLOSSOM HAS WHEELS (Poem MERZ Nr. 1.)

Oh thou, beloved of my twentyseven senses, I love thine! Thou thee thee thine, I thine, thou mine. — We?

That belongs (on the side) not here. •

Who are thou, uncounted woman? Thou art — art thou? — People say, thou werst. — let them say, they don't know, how the churchtower stands. Thou wearest thy hat on thy feet and wanderst on your hands, on thy hands wanderst thou.

Hallo thy red dress, clashed in white folds. Red I love Anna Blossom, red I love thine! Thou thee thee thine, I thine, thou mine. — We? —

That belongs (on the side) in the cold glow. Red Blossom, red Anna Blossom, how say (the) people?

Prizequestion: 1. Anna Blossom has wheels.

2. Anna Blossom is red.

3. What color are the wheels?

Blue is the color of thy yellow hair.

Red is the whirl of thy green wheels.

Thou simple maiden in everyday-dress, thou dear

green animal, I love thine! — Thou thee thee thine, I thine, thou mine. — We?

That belongs (on the side) in the glowbox.

Anna Blossom! Anna, A-N-N-A, I trickle thy name. Thy name drips like soft tallow.

Dost thou know Anna, dost thou already know it?

One can also read thee from behind, and thou, thou most glorious of all, thou art from the back, as from the front: A-N-N-A.

Tallow trickles to strike over my back.

Anna Blossom, thou drippes animal, I love thine!

(Translated by Mrs. M. Klein.)

Psychological studies have brought nearer to us the biological mechanics of emotion and expression in permanently personal, interior sense largely independent of cultural influences; children, for instance, who have little consciousness about the machinery of society, or the psychotics who are already beyond its reach. The subconscious desire to see how these impulses work in practice, and a yearning for a similar independence from conscious patterns brought a great wave of appreciation of children's drawings and paintings around the same time that "Anna Blossom" was published. H. Prinzhorn's book[•] on the art of the mentally ill, especially of schizophrenic patients, aroused the same great interest, describing their paintings, carvings, modelings and writings, their expressive fertility and uninhibited use of language.

They have given a stimulating impetus to the all-searching poets, just as the study of the Negro sculptures gave stimulus to the painters of the "fauves" and the early cubists.

the psychotics

As poems of the psychotics cannot really be translated, it was important for this study to locate material written in English. This type of research, however, is at its beginning in this country, and I found but few references.^{••} Such investigations may become valuable in therapy. They may also give some leads to a more constructive and balanced education which would prevent psychopathological disturbances.

Here are some writings by psychologically disturbed patients. The first two are by a schizophrenic, collected by L. Kerschbaumer, M. D.^{•••}

Bills Epitaph

*A regular pirrotin' caballero if there ever was one.
The better 7/8ths and I saw him in Ziegfeld Follies
First tossin' a loop and chewin' quid of gum and soliloquizin'
On Washington cherries not George but D. C. Washington.
And the way he talked about the D. C. Washington hocus!
You got the low-down on the higher-ups.
Well, after about 80 of the swellest slickest sylphs
You ever got an eyestrain over
Cut their capers and how?
You get the drift! that line of Kipling's "Nothing much before
and rather less than half of that behind!"*

*Only relation to vesture 'cause there sure was some swell
Upholstery stuffin's if you know what I mean?
The better 14/16ths comments inadvertently didn't you give me
Those opera glasses? Your eyes must be in awful
Shape sitting in second row and you have to use
Bifocals they don't exray do they?
I came back with lame ephorisin', no my dear
Wish 't was so, the better 28/32nds. You paid two
Box-cars for the squats so squeak you! But believe me
Xantippe your getting your gappin's! Then
Bill saved from bitin' myself by sasshayin'*

• *Die Bildnerei der Geistes-Kranken* (Julius Springer 1922, Berlin)

•• "A Survey of the Literature on Artistic Behavior in the Abnormal," by Anne Anastasi and John P. Foley, Jr., in the *Journal of General Psychology*, 1941/25 and in the *Psychological Monographs*, Volume 52/1940, published by the American Psychological Association, Northwestern University, Evanston, Illinois

••• "Journal of Nervous and Mental Disease," Vol. 91/No. 2, (1940).

Fig. 410. Ferdinand Cheval, 1899

One of the facades of The Ideal Palace, Hauterives (Drome, France)

Cheval, born in 1836 at Charmes (Drome) was a rural mailman at Hauterives, where he died in 1924. In his thirtieth year he saw in his dream a castle. Unaided he constructed in his garden between 1879 and 1912—often during the night—"The Ideal Palace", mainly from pebbles which he collected on his route. This uninhabitable palace covers a surface of approximately 44 by 82 feet and has numerous inscriptions

This illustration shows the side dated 1899 and inscribed as "The Fairies of the East Come to Fraternize with the West"



On with quid of gum workin' overtime wearin'
Texas fitting's twirlin' a loop he how-does the
Folks tosses the ten gallon skypoke sixty
Feet t' other side of stage and snaps loop over crown
Just about time she lands and
Hauls it back to him, while he's up to this
Given the politicallers the run-around and
Chewin' gum. Well that's something to see
Sez the better $5\frac{5}{6}$ th. You can't even get your
Skypif the wind gives it toss without five
Newsies two cops and white-wings to help you. I am reduced!
but I sez anyway
Them chassis's was swell! Bam! her elbow
In my short ribs. Well Bill saved the
Day again. A propwaddie saunters on stage
Far side from Bill smokin' a quirly.
Bill gives him stanca tosses loop at him sixty
Feet away and knocks ash from cigarette,
Asks for 'nother chance. This time he gets quirly and yanks it

in takes couple puffs to show its
Lit. I mean that's shootin' snips sez the better
 $11\frac{3}{4}$ ths. Well Bill walked away with show. And
That's just what he does all through life. Hits
Your town the milk fund needs few grand
Or children, old folks or bunged up folks need
Lift. Always right there with helpin' hand
Not a bunch of hooey. Maybe you perused them
There billet-doux he ran in papers. If
Bill didn't tap the nail on the noggin' who ever did.
When he's wash up those D. C. Washingtoners.
I mean they were washed and it was
Not white wash. Well all the way
Through top, bottom and in middle and
Both sides he was Realy Guy a Gentleman
And Scholar I salute you Bill Rodgere.

(1938)

Sonja Henie

*Aphrodite Iris of etherielly is Sonja Henie
When you see her on glaciaryms
Don't you fly mentally with her through air?
She makes a swift flash!
A flying zephyr of airicle voluptuous velocity replete*

*Encore
Now the flying airicle voluptuous zephyr
Give the commonalty a visual treat
"The Birth of a Nation" was a great picture
But see Aphrodite Iris etherials next jumping tintype.*

The author of both pieces is a 47-year-old schizophrenic inmate of a State hospital. Dr. Kerschbaumer calls this type of poetry "emotional catharsis."

●

The other poems of psychiatric patients are from the collection of Miss Marion Kalkmann, Director of Nursing, the Neuropsychiatric Clinic, University of Illinois.

The following was written by a 30-year-old woman five days before admission to hospital, while under the care of a private physician.

The Raindrop Prelude

*Dedicated to my Physician
(at 3:50 A.M., Nov. 26, 1932)
(Not Written by Chopin)*

*Poets say it's pitter patter;
Why not tipper-tapper-tip
That the "mellow" raindrops "whisper"
As they scatter
Skitter, skip—(just my way of saying drip).
Or it could be potter-putter*

*That I hear upon my shutter
Just a splutter
And a mutter
Or such low-brow stuff as gutter!
Though I really think the word I hear
Is just plain
Butter, butter.*

One patient, a 21-year-old college girl, who incessantly chattered, was asked to write, in order to quiet her down. Here are four of her answers to the order; all written the same day.

1.

Moan if you will, you chugging flame and steel
groan and cry
soar and zoom
grind and roll
bring us closer, closer, closer
but do men know why

when you ask them?

They say . . . It's streamlined

it shines

it goes like a bat out of

hell

out of

hell

out of

hell

out of

hell

2.

and why could William Shakespeare
write?

A simple thing . . .

he lived

each frame should be as beautiful
as mine

each voice should ring as clear
but long and evil years

good and evil years

evil and good years

are pushing, whirling, rolling, lagging, tossing, crying,
crying, singing, singing, singing

P.S. Will this do for my assignment?

3.

Thanks for tossing crystal brambles my way, sir . . .

They came in handy . . .

If you had analyzed . . .

and scrutinized . . .

and criticized . . .

I wouldn't be alive.

If this were music . . . real music . . .

I could explain

but we must wait for that—I mean

the music

when each note is weighed

when emotions are expressed carefully

by contrapuntal

you and I will have our noses to the
earth

However in the meantime—just

an ordinary thanks—have,

P.S.—By the way, I like your nose.

4.

contemplate

contemplate

con . . .

temp . . .

plate . . .

music, I wait for you

music, you're coming near

stealing . . .

softly

loudly

harmoniously

discordantly

I hear your note-like footsteps everywhere

beating beating beating

beating conversation for some to hear

while others lie mouldering

and wait

Churn those jarring atoms

I want some music, maestro—

please!

children's verses

Verses, recitals, writings of young children before they are overrun with the convention of mechanistic rhythm and rhyme of the kindergarten such as, "Twinkle, twinkle, little star . . ." have a primordial aliveness, similar to the writings of the psychotics.

*"I love papa
little chicks go down his face—
he is funny looking though
but mammy is funnier than him.
There is something I know about dad;
there is a funny cock roosting in our barn*

*and there is a paddle in the water.
Goggle, goggle, I love you father
soon there will be father's day
Bushy says hurrah ah ah ah!"*

(Poem of a four-year-old girl)

*"Mary Lambie
Mary Lambie guy bib
Had a walk with
Pie hib*

*They both went crazy
When they got lazy
Mary Lambie
guy bib.
To-da-la-ta-tat."*

(written by an eight-year-old girl)

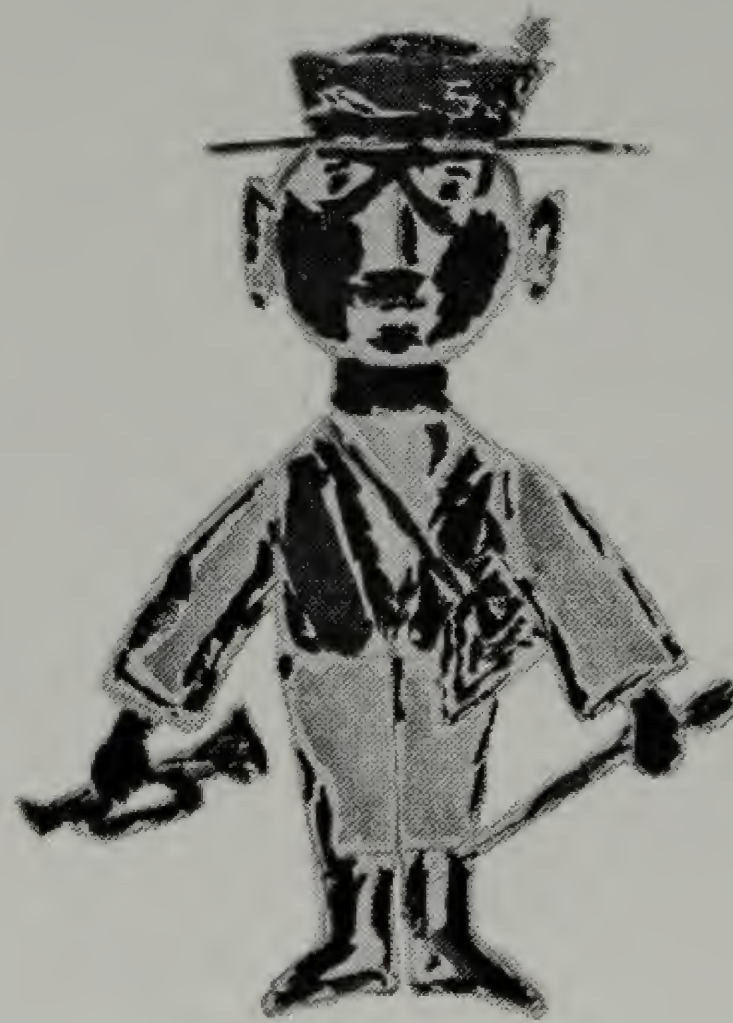


Fig. 411. Child's painting

For a child there is no difficulty in making a painting, drawing or sculpture. His natural readiness to express himself helps him to handle every medium without embarrassment. The grownup in the future must regain this confidence and power, usually lost or turned into self-consciousness by the traditional educational processes

*"Skeleton
I bob apples
a cat
Cats are black.
Cats are pink.
Cats are black.
Cats
White cats
Brown cats
Kittens
Yellow"*

(by a six-year-old child)

A third grader at one of the Chicago public schools just before Christmas turned in the following composition on the subject:

"What I Want for Christmas":

*"I like a rifle because I can play guns because I like to play guns
it is fun to play guns you hide in bush I like to play guns you hide
I will find you it will be fun to play guns. Guns is fun to play
guns is a funny game to play guns is a game you have to hide
when you play guns."*

(Chicago Sun, January 1, 1945.)

In both cases, in that of the child as well as that of the mentally ill, sincerity, strong fantasy and penetrating power of expression are predominant. Here "art" is not a matter of professional performance nor the result of high intellectual standard. The measurement of quality is proportional to the emotional intensity with which the individuals express themselves. On this level we may speak of the "art" of

children, primitives, psychotics, catacomb dwellers and the art of Milton, Whitman or other authors. Poetic quality then originates where there exists an identity of both the potentiality of the individual for expression and his verbalized solution. The expression of the child or psychotic person is mainly an emotional release without ideological connotations; the "professional" writer must go beyond that by sensing and expressing the social relationships around which, consciously or subconsciously, his material coagulates. The one is verbalized "doodling," the other is organized context.

sound and number magic

Without trying to define Schwitters' peculiar poetic quality, it can be said that most of his writing is emotional purgation, an outburst of subconscious pandemonium. But they are fused with external reality, with the existing social status. His verbal "collages" are good examples of this. There the current of his thoughts are mixed with seemingly random quotations from newspapers, catalogs and advertising copy. With this technique—like Gertrude Stein, but more acrid—he uncovers symptoms of social decay known to all, but neglected or dodged in a kind of self-defense. The scene is Germany. Inflation after the war; corruption, waste, damage to material and man. An abortive social revolution makes the situation even more hopeless. Schwitters' writings of that period end with a desperate and at the same time challenging cry.

In one of his demonstrations he showed to the audience a poem containing only one letter on a sheet:

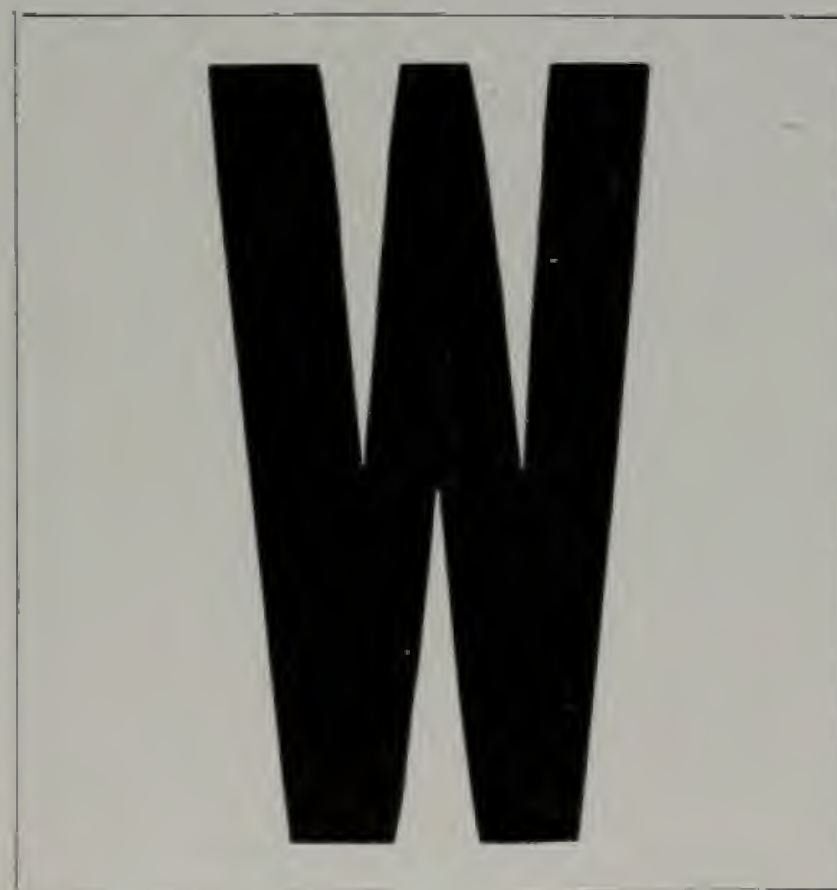


Fig. 412. Kurt Schwitters, 1924
Poem

Then he started to "recite" it with slowly rising voice. The consonant varied from a whisper to the sound of a wailing siren till at the end he barked with a shockingly loud tone. This was his answer not alone to the social situation but also to the degrading "cherry-mouthed"—"raven-haired"—"babbling-brook"—poetry.

The only possible solution seemed to be a return to the elements of poetry, to noise and articulated sound which are fundamental to all languages. Schwitters realized the prophecy of Rimbaud, inventing words "accessible to all five senses." His "Ur-sonata" (1924)—*Primordial Sonata*—is a poem of thirty-five minutes duration, containing four movements, a prelude, and a cadenza in the fourth movement. The words used do not exist, rather they might exist in any language; they have no logical only an emotional context; they affect the ear with their phonetic vibrations like music. Surprise and pleasure are derived from the structure and the inventive combination of the parts.

Fig. 413. Kurt Schwitters, 1924
Introduction to the "Primordial Sonata"
("Ursonate")
In this poem Schwitters used only sounds without verbal meaning. The impact of the poem came from its unusual strong musical quality produced by high pitched vowels and the rumbling of consonants

einleitung:

Fümms bö wö tää zää Uu,
pögiff,
kwii Ee.

Ooooooooooooooooooooooooooooooooooooo,

dll rrrrrr beeeee bö,
dll rrrrrr beeeee bö fümms bö,
rrrrrr beeeee bö fümms bö wö,
beeeee bö fümms bö wö tää,
bö fümms bö wö tää zää,
fümms bö wö tää zää Uu:

(A)

erster teil:

theme 1:
Fümms bö wö tää zää Uu,
pögiff,
kwii Ee.

theme 2:
Dedesnn nn rrrrrr,
li Ee,
mpiff tllllf too,
tlllll,
Jüü Kaa?
(gesungen)

theme 3:
Rinnzekete bee bee nnz krr müü?
ziiuu ennze, ziiuu rinnzkrmmü,

rakete bee bee.

theme 4:
Rrummpff tllllf toooo?

1

6

5

1

2

3

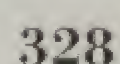
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4

Such sound rhythms were preceded long ago by tongue twisters. Their value lies in their elementary phonetic power and their primitive directness as tongue and ear ticklers.

"If a Hottentot taught a Hottentot tot to talk ere the tot could totter, ought the Hottentot tot be taught to say ought or naught or what ought to be taught 'er?"

4



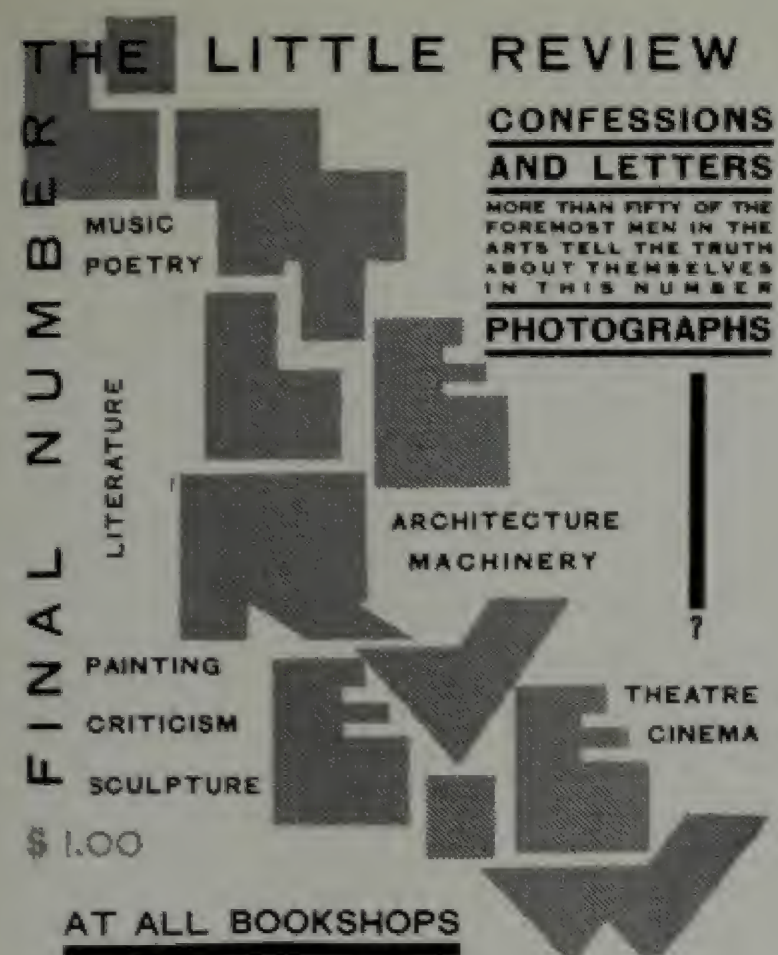


Fig. 417. Title page of "The Little Review", 1928

Edited by Jane Heap and Margaret Anderson. This was the last issue of the magazine



Fig. 418. The seal of the avant garde review, "Broom", 1922

Edited by Harold Loeb and Matthew Josephson, in collaboration with the Americans Malcolm Cowley and Man Ray, as well as a great number of European artists and writers

Fig. 419. Title page of the "transition", by Miro, 1937

After "Broom" was discontinued, "transition"—published by Eugene Jolas—took up the tradition of the avant garde and printed from 1924 to 1939 the most advanced creative work in art and literature



lenged the band: "One million and three," he teased them singing loudly. "One million and seven," answered the saxophonist somewhat hesitatingly. "Seven and a half," the first resumed;

"Eleven," came quickly from the violinist.

"Twenty-one," the piano player shot between.

"Five million and a half"

"Seventy-seven"

"Sixty-three"

"One and a quarter,"

and with happy laughter and shrill singing the "numbers" took over the place.

the new poetry

The futurist-dadaist poems, bare of all "sense" in the accepted ways of one-dimensional logical and declaratory communication, brought about a temporary saturation of the inventive spirit. The dynamic march ended after the critics had acknowledged it either indirectly (by their furious attacks) or directly (by their back-patting attitude).

Dadaist literature and all the other arts attempted to consolidate their position. The dissidents of many different countries found each other quickly. In the U. S. A. they gathered around publications like *291*, *Little Review*, *Seven Arts*, *391*, *Dial*, *Broom*, *Sn4*, *Secession*, *Contact*, *transition*.

Strengthened by the rich though diverse efforts of Poe, Melville, Whitman and others, the Americans Alfred Stieglitz, Margaret Anderson, Jane Heap, Freytag-Loringhoven, Gertrude Stein, T. S. Eliot, Mathew Josephson, Eugene Jolas, worked alone or in collaboration with their European colleagues, Apollinaire, Marinetti, Stramm, Vasari, Picabia, Cendrars, Huelsenbeck, Tzara, Arp, Joyce, Schwitters, Bonset, Ribemont-Dessaignes, Malespine, Dermée, Aragon, Breton, Soupault, Auden, Spender, Read, Ady, Kassak, Barta, Mayakovsky, Pilniak, Nezval, Polianski, Micic, Pasternak, etc., etc.

surrealism

In 1921 Tristan Tzara, the leader of the dadaists, left Switzerland for Paris. He tried to organize Dada among his French colleagues. From this very active group, after several more or less unimportant conflicts, the surrealist group emerged under a new leader, Andre Breton. Breton, formerly a psychiatrist, had been interested for a long time in the work of Sigmund Freud, who—in his psychoanalytical studies—showed how subconscious repressions, especially of sexual nature, determine feelings and actions of the individual. These emotional forces expressed sometimes by automatic actions, such as mispronunciations, misspellings, omissions, lapses, doodlings, became inspiration and source material for surrealist creation. They added a new species to the arsenal of literary expression: "automatic writing." Originally it was a psychological experiment made by Breton and Soupault as emotional purgation in a kind of self-hypnosis, the writing down of

thoughts occurring without conscious control. "Invocation to inspiration. Magic art. Write immediately!" said Baudelaire, anticipating this technique.

Later the surrealists tried to simulate all types of psychotic writings. It was the first time that writers had not to go to foreign sources, to the work of children, primitives or psychotics, when the study of *uninhibited* inspiration was desired. They produced the "uninhibited" expression themselves.

"Surrealism is at the crossroads of several thought movements. We assume that it affirms the possibility of a certain steady downward readjustment of the mind's rational (and not simply conscious) activity toward more absolutely coherent thought, irrespective of whatever direction that thought may take; that is, that it

proposes or would at least like to propose a new solution of all problems. . . . That is why one may express the essential characteristics of surrealism by saying that it seeks to calculate the quotient of the unconscious by the conscious."

(Pierre Neville).

"One must be willing to dream and one must know how." (Baudelaire)



Fig. 420. Oscar Schlemmer, 1923

Party

The rendering of the subconscious started long before surrealism. This is the reason that the surrealists may claim anyone from the history of art as their comrade

Breton, Soupault, Eluard all found that writings without logical control were much more vivid and the use of language much more vital. They were fascinated by the automatic writing, by its great explosive power, a new TNT of the soul. They tried to build up the language of the subconscious as the truer expression of the individual—freed from external pressure, escaping the censorship of convention and conformist obedience. They were eager to discover stimuli which had been neglected in the past because of an overzealous interpretation of reality based only upon familiar external experiences. Surrealism answered the official reality of daytime logic with the "omnipotence of the dream." With emphasis on the realm of the subconscious. And with the demand for a "pure psychic automatism which is to express the real process of thought. Thought's dictation in the absence of all control exercised by reason. . . . Living and ceasing to live are imaginary solutions. Existence is elsewhere" (Andre Breton). The "don't care" of the dadaist attitude was here transformed into scientific terms of a new therapy for a society, sick and out of balance. In this sense contemporary literature as well as abstract painting can be understood as stepping stones to a new philosophy; a visual parable of a world which has to go through the same discovery of the complex interdependence of its functions as the individual in his newly conquered relationships of conscious and subconscious forces. If such a society—conscious of its forces and functions—should ever be realized, all its members must have sufficient preparation to adapt themselves to the changed circumstances. Only then will they avoid interpreting the new forms of existence with old meanings. Such preparations cannot be merely intellectual ones, they have to be combined with the emotional needs and capacities of the individual. This process is more complicated than simply following the political rules of a party platform.

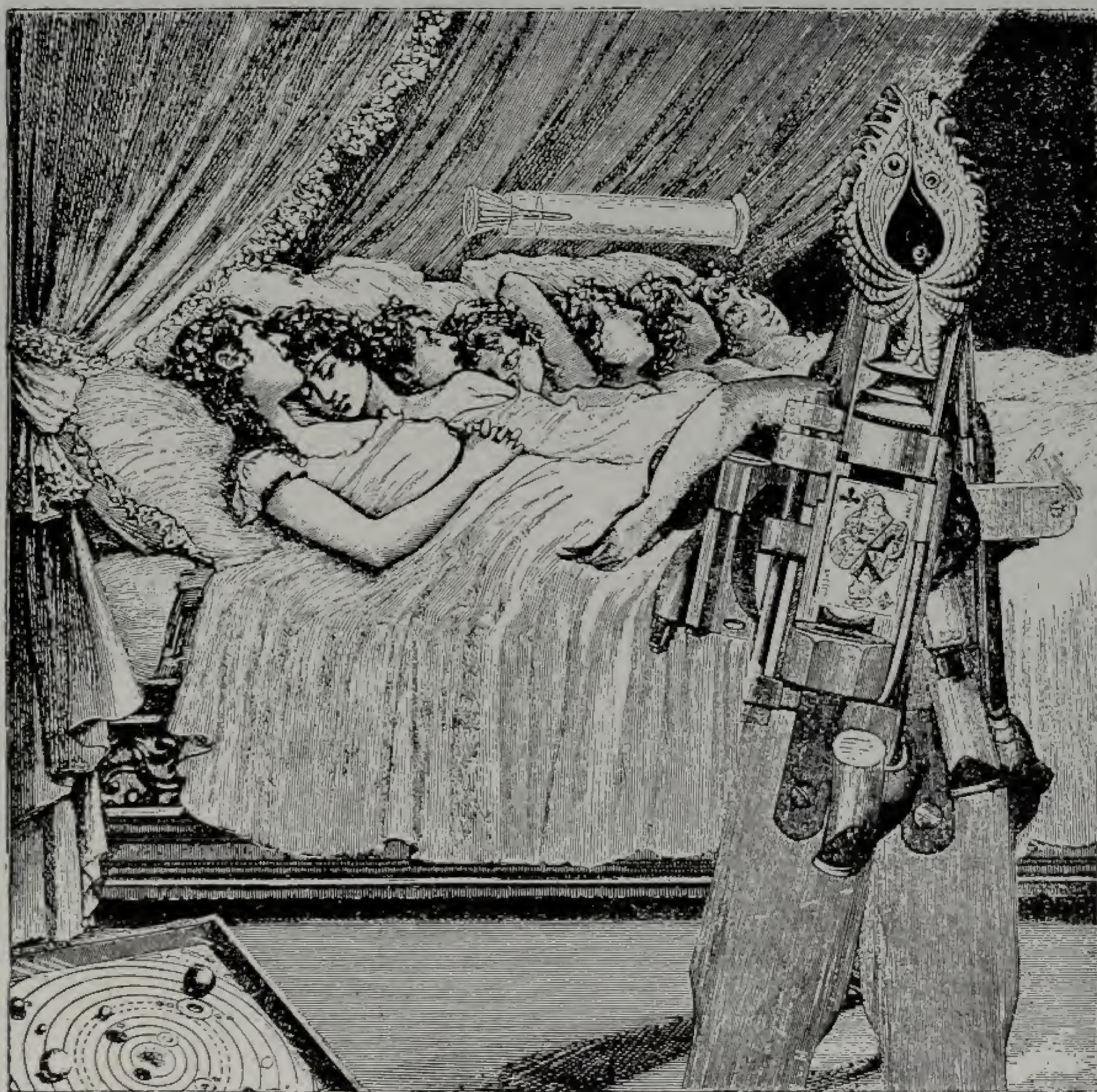
The training of the mind can be accomplished by elementary exercises and exercises of a higher order; by reading, thinking and analysis. The same is true for the emotional life. It must begin with basic "exercises" then advance to experiences of a more complex and refined nature.

The forms of the advanced process are unpredictable. They usually appear first in the creative fields which preconceive results not yet intellectually defined but only intuitively felt. The events of a period, its discoveries, the tendencies of the socio-



Fig. 421. Joan Miro, 1931
Stencil print

Fig. 422. Max Ernst, 1928, "My seven
sisters dream" (montage)
Instead of photographs, Ernst employed
woodcuts for his dadaist—and later, sur-
realist—montages



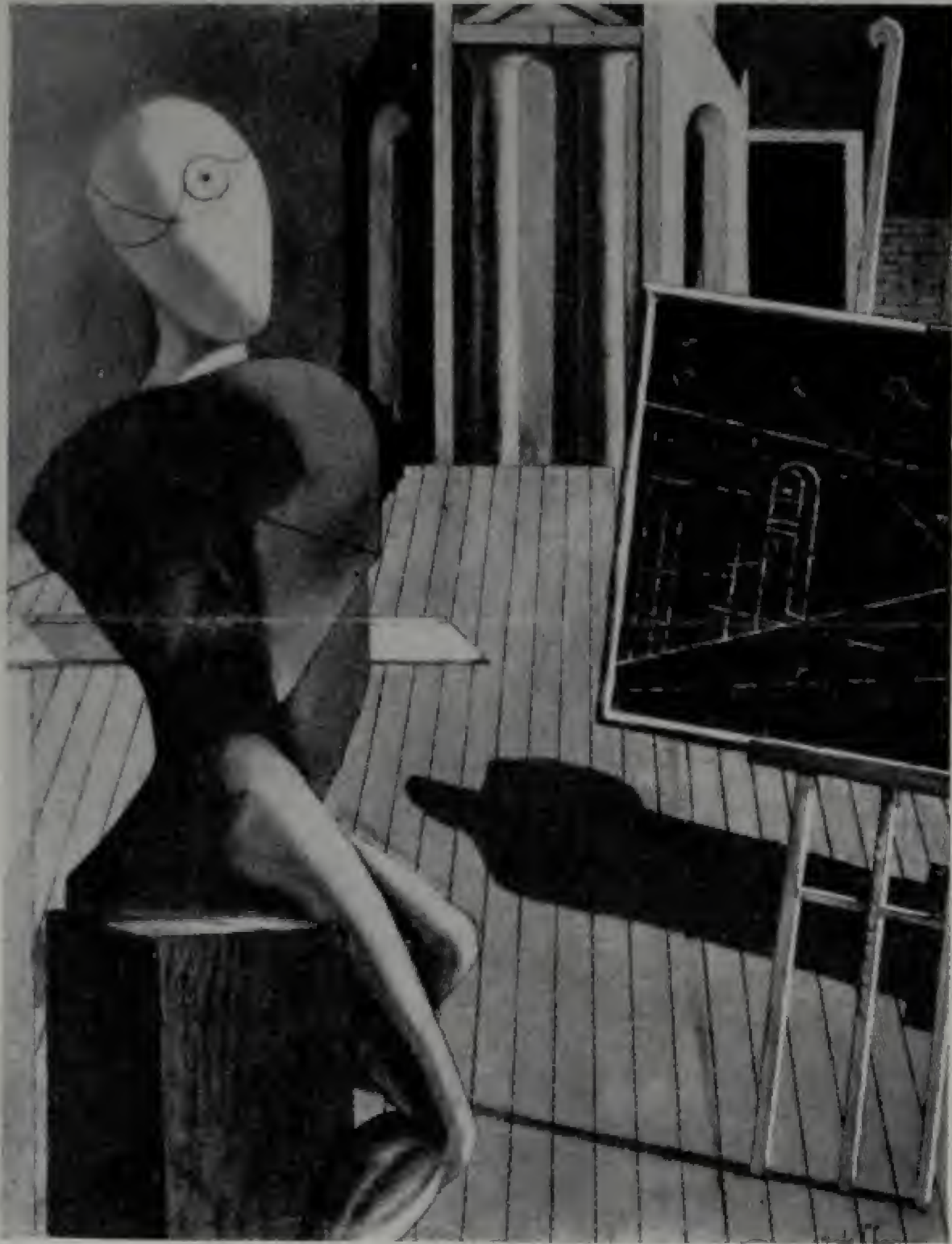


Fig. 423. Giorgio de Chirico, 1917

The Seer

The early Chirico pictures are the most forceful renderings of a nostalgia for the classics, combined with the bleakness of the mechanized industrial age

The young generation took up much of the dictionary of the abstract, dadaist and surrealist painters. They are often very difficult to classify, but all have one thing in common—they paraphrase the emotional, subconscious flashes, and try to organize the chaos of the unspeakable. Many of the painters, however, who do such work (as Klee, Arp, Ernst, Man Ray, Picasso, Braque, and, astonishingly, even Léger) produce often also non-objective paintings

Fig. 424. Marc Chagall, 1911
Bucolic Bliss



Fig. 425. Meret Oppenheim, 1936
Fur Cup, saucer and spoon
Among all the surrealist objects ("objets") this fur cup is most revealing as to the subconscious function of perception and association





Fig. 426. Fernand Léger, 1942
Abstraction



Fig. 427. Herbert Bayer, 1941
"Torture chamber"

Fig. 428. O Robert Erickson, 1944
Black Dream



economic forces, forecast the trend for the sensitive and synthesizing man of creative abilities. He will summarize them in a form peculiar to his medium.

There is always a phalanx of creative workers moving in that direction. They are the makers of the new intellectual and emotional tools which—perhaps generations later—will be adopted for mass use.

The new poets opened the sluices of subterranean forces. Ashes, soot and lava streamed over the literary field. It was a surrealist triumph to see a deeper sense in the bubbling sentences and unrelated words of the automatic writings. Dreams, children's rhymes, rhythmic jokes of adolescents, "the right of man to his own madness" (Dali) became the foundation of enigmatic writings, a scientifically justified source of material.

1.

(Eleven people were each asked to jot down one line on a sheet in a certain order of grammatical construction, but without a knowledge of the others' writing).

"This night
runs darkened
through parchment
with horror.
gently—
The cat loves, kisses tell
freshly
thru the son of Uceus
against whom?
Cautiously
a stone"

by Paul Eluard

Simulation of General Paralysis Essayed

... My heart bleeds on thy mouth and closes on thy mouth on all the red chestnut trees of the avenue of thy mouth where we are on our way through the shining dust to lie us down amidst the meteors of thy beauty that I adore my great one who art so beautiful that I am happy to adorn my treasures with thy presence with thy thought and with thy name that multiplies the facets of the ecstasy of my treasures with thy name that I adore because it wakes an echo in all the mirrors of beauty of my splendour my original woman my scaffolding of rose-wood thou art the fault of my fault of my very great fault as Jesus Christ is the woman of my cross—twelve times twelve thousand one hundred and forty-nine times I have loved thee with passion

2.

(Six people participated in writing one sentence each on a sheet without knowing anything about the other participants' sentences.)

"It may be height of low we got
in deepest depths
where men laid then lie about
from mediocrity to oblivion
would bring a rose
then I will go home"

(Institute of Design) August 3, 1944

Fig. 429. ○ Emerson Woelffer, 1945
Figure objects

on the way and I am crucified to north east west and north for this kiss of radium and I want thee and in my mirror of pearls thou are the breath of him who shall not rise again to the surface and who loves thee in adoration my woman lying upright when thou art seated combing thyself.

Thou art coming thou thinkest of me thou art coming on thy thirteen full legs and on all thine empty legs that beat the air with the swaying of thine arms a multitude of arms that want to clasp me kneeling between thy legs and thine arms to clasp me without fear lest my locomotives should prevent thee from coming to me and I am thou and I am before thee to stop thee to give thee all the stars of the sky in one kiss on thine eyes all the kisses of the world in one star on thy mouth

From "L' Immacule Conception" Translated by Samuel Beckett•

• from "Surrealism" by Julien Levy; published by Black Sun Press, New York, 1936.



From
"The White-Haired Revolver"
 by André Breton (1932)

*Where a hammock that they have been at pains to contrive
with their tresses for
Me is reserved for
Me for all eternity
Exhort me before taking their departure not to catch a chill in
the perusal of the daily.*

Translated by Samuel Beckett •

by Paul Eluard ••

Between the leaden thread and the noise of the wind
Between the fountain of ants and the cultivation of strawberries
Between the horseshoe and the fingertips
Between the chalcedony and winter in pins
Between the tree of eyeballs and verified mimicry
Between the carotid artery and the ghost of salt
Between the araucaria and the head of a dwarf
Between rails at a junction and the russet dove
Between man and woman.
Between my solitude and thee.

from "La Vie Immediate", 1932

- From "Surrealism" by Julien Levy, published by Black Sun Press, N. Y. 1936.
- From Partisan Review No. 5 1939, "The Poetry of Paul Eluard" by Louise Bogan.

by the dadaists' achievements of a multidimensional language. All is not fantastic which is called so; there are pseudo-fantastic writings behind which only a traditional one-dimensional thinking works.

Scientific discourse produces a clear one-dimensional statement-language striving for photographic precision. The poet has to give more. He communicates more profoundly with his contemporaries by dropping the logical context, the habitual syntax and by returning to the roots of creative impulse. There is no need for the poet to pose pedagogic or philosophic questions. If he concentrates on the unique task of evoking rich emotional reactions by uncovering the savage depths or tender passions of existence, he will express a philosophy as a poet.

**Excerpts from
Mr. Knife Miss Fork**
by Rene Crevel (1900-1935)

Useless to point out that there is a white race, a yellow, a black, a red race, but none sky-blue; useless to say that houses are built of stone or brick and are hence white or rose, or that the grass in the fields grows green. A child reconstructs the world according to his own caprice, preferring above all the fabulous animals, making fun of the swans in the Bois de Boulogne, laughing in the faces of the bears in the Jardin des Plantes, despising lions, camels, and elephants, and deigning to cast a glance upon the rhinoceros only because of the horn that is planted there on him where you would never expect to find one. And how many questions were asked about the gnu that the old cook used to chase away at dusk last autumn in the country.

But at this moment the apocalyptic beast was death, and with eyes big enough to swallow the whole universe the child once more demanded: "What is death? What is a whore?"

"The lesson is over darling."

"But you haven't answered."

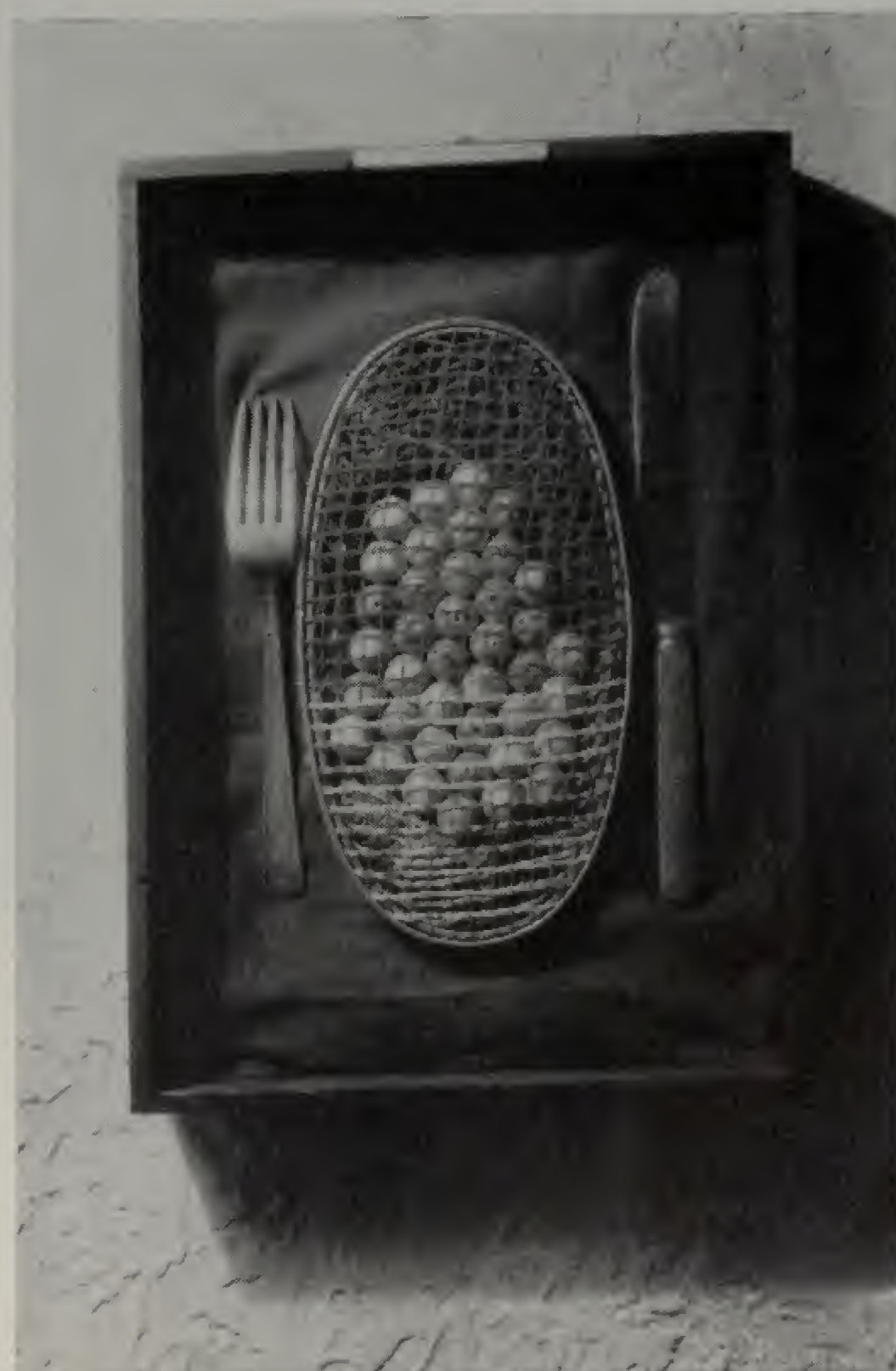
"Run along and play. Tell your nurse to give you tea."

The child recognized the futility of persisting. She went as she was told but not to ask for bread and butter. She took a knife and a fork and, hiding away in a corner of her room, she began to talk very softly to herself.

"The knife is Papa. The white part that cuts is his shirt and the black part you hold in your hand is his trousers. If the white part that cuts was the same as the black part, I could play he was in pajamas, but it's too bad I can't do that.

"The fork is Cynthia. Beautiful Cynthia, the English lady. This is Cynthia's hair, the part you stick into the food when you want to take it off your plate. She has a pretty bosom that moves up and down because she is out of breath. Papa is very happy. He caresses Cynthia and he laughs because he thinks it is two little birds she has closed up in her dress." . . .

Fig. 430. Man Ray, 1944
"Mr. Knife and Miss Fork"
Dedicated to René Crevel (from "Objects of my affection")



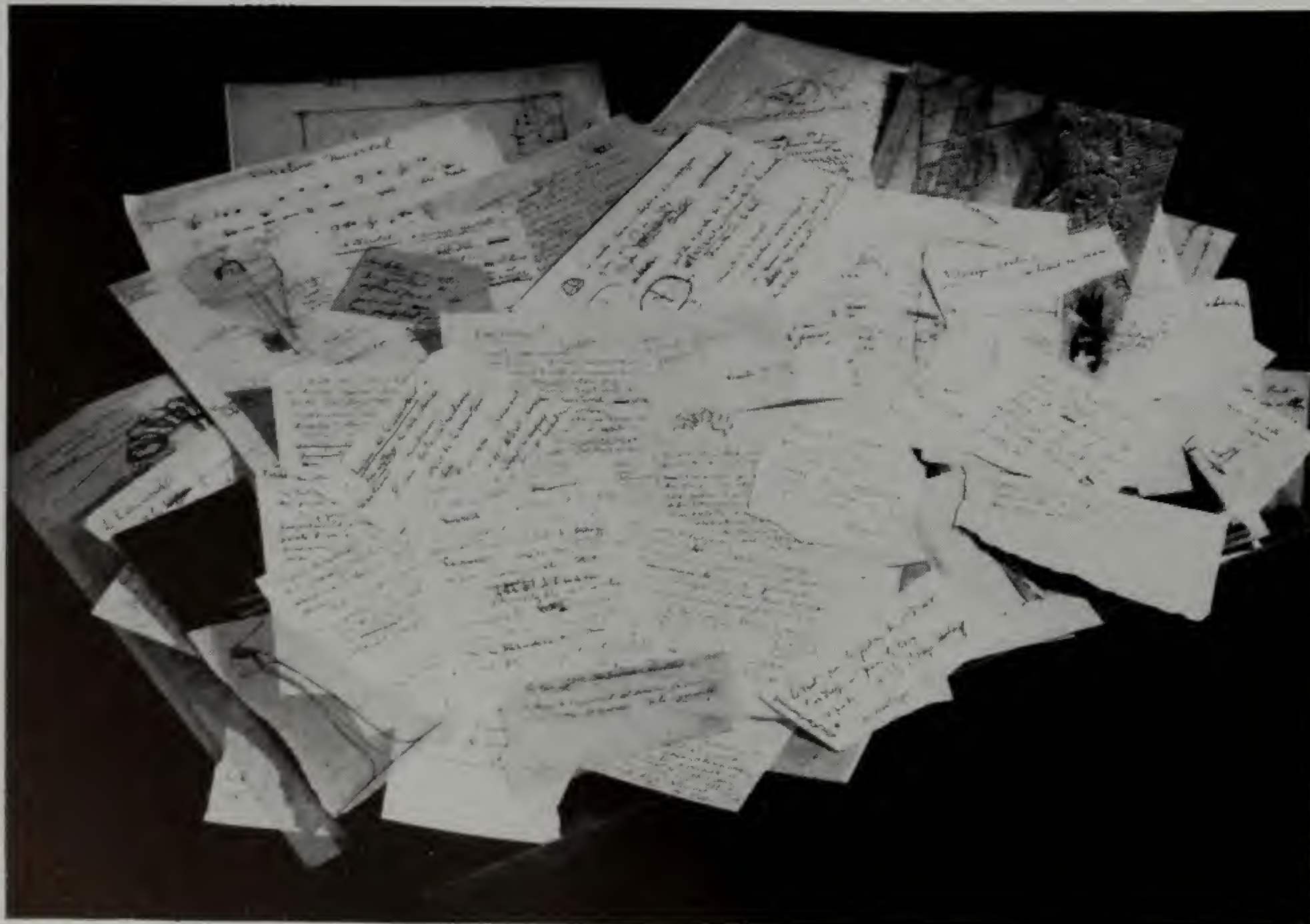


Fig. 431. Marcel Duchamp, 1936

"Book" (portfolio)

Duchamp was asked to publish his life work. With a typical dadaist gesture, he emptied the contents of his desk—notes, drawings and photographs of the last twenty-five years—into a cardboard box. All this was faithfully reproduced and put into a portfolio without chronological or any other order, leaving the "mess" to be disentangled by the reader.

"You desire a popular art? Begin by having a "people" whose minds are liberated, a people not crushed by misery and ceaseless toil, not brutalized by every superstition and every fanaticism, a people master of itself, and victor in the fight that is being waged today."
(Romain Rolland)

Hands off China

(Agitverse 1927) •

by Vladimir Mayakovsky

War—
daughter of imperialism,
stalks
a spectre through the world.
Workers, roar: Hands off China!

Hey, Macdonald,
don't meddle
in league and muddle speeches.
Back, dreadnoughts!
Hands off China!—

In the embassy quarters
kings meticulously
sit, weaving a web of intrigues.
We'll brush away the cobweb.
Hands off China!—

Coolie,
enough of dragging them, cool in
rickshaws,
straighten your back,
Hands off China!

They want to pulverize
you with a colony,
400 millions, you're no dove
Louder, Chinese:
Hands off China!—

Time you drove
these drivers out,
dropping them off the wall of China.
Pirates of the world,
Hands off China!—

We're glad to help
all enslaved to fight
teaching
and providing
We're with you, Chinamen!
Hands off China!

Workers,
rout the robber
night, fire as a rocket
your fiery slogan:
Hands off China!

art and society

In contrast to their poetic works the theoretical writings of the surrealists are very logical, intelligent and persuasive, such as the book "What is Surrealism?" (by André Breton, 1937). This sharpness of analysis the surrealists had in common with the futurists and the dadaists. Breton had understood that it is worth while to logically articulate the aims of a group because collective success also brings a personal reward.

Like the dadaists, the surrealists had a deep belief in the revolutionary character of their work. Consequently, at the beginning they declared their adherence to communism as the most revolutionary party of the world. Some of the party communists were reluctant to accept this solidarity and attacked the new followers bitterly. These attacks were based upon the party principle which demanded absolute obedience from the artist not only to the strategy of the proletarian revolution but for its tactics as well; in other words, the origin of the conflict was group decision vs. individual interpretation.

After the Bolshevik revolution in Russia (November 1917) at first only a small group of intellectuals joined in the fight for consolidation. Among them, most influential were the symbolists under Alexander Block and the Russian futurists under Mayakovsky's leadership. Lenin's government accepted their enthusiastic collaboration as they were good allies carrying the torch of the revolution. But after the Soviet governmental framework began to routinize itself and tried to bring the masses of illiterate people into contact with the revolutionary machine, the demand was for a popular art, a proletarian culture ("proletcult"). Futurism was dismissed as "bourgeois decadence," as linguistic acrobatics playing with form without ideological foundation, without "social significance." This objection was raised against not only literature but against abstract painting and sculpture as well. Cubism, dadaism and constructivism encountered the same hostility. Every experimental work, not showing immediately applicable political tendencies, and not giving unequivocal clues to its complete conformity to the "party line," was rejected.

The "proletcult" was short lived. At the end of 1921 the N.E.P. ("new Economic Policy")—inaugurated by Lenin—restored greater tolerance, easing the dogmatic severity of Russia's ideological life. This was the period of the "fellow travelers." It was toward the end of this period and at the beginning of the first Five Year Plan in 1925 that the surrealists showed their interest in the communist party. The N.E.P. attitude of conciliation had not yet expired and the Five Year Plan's conscious effort—to utilize every source of persuasion for immediate projects—had not yet fully developed. Until this happened the surrealists had, at least, the chance to discuss their literary aims. But by giving up plans for world revolution, Stalin's victory over Trotsky consolidated the national front in Russia. The demand of the communist party was for one hundred per cent service in an all-out propaganda for more in-

• Translation by George Reavey and Marc Slonim, from "Soviet Literature" Covici, Friede, Inc., Publishers, New York, 1934.

dustrial projects and production reorganization. This required staunch (the so-called "social") realism. Surrealism as well as other experiments in the field of art (including painting, sculpture and architecture) were completely dropped (Kharkov Congress, 1931). The possibility that these artists might be misused by counterrevolutionary forces who would exploit their inexperience in tactical matters, is what party politicians generally supposed. However the fermenting power of the avant-garde, although it acts slowly, is so important for progress that it would have been worthy of official sponsorship. A wise policy should have supported "experiments" even if they seemed to be unpredictable in their consequences. Paradoxically, the less predictable the consequences, the richer they may be in their potential usefulness for a better future.

Again and again artists must state that revolution is indivisible and that the intellectual and political strategy of the revolution must be accompanied by a long-term emotional education. Only correlation and integration can bring a change in habits and attitudes of the people rooted in and grown out of previous conditions. "But this is evolution, not revolution"—may be answered. On the other hand, in the past the dynamic power of every revolution has disintegrated when it fell into the hands of politicians who did not grasp the importance of a simultaneous program.

Sigmund Freud

We have not yet acquired sufficient perspective to see the proper value and contribution of the futurists, dadaists, surrealists and other contemporary writers. But it is safe to say that they were the intuitive beachcombers of the subconscious, systematically explored by Sigmund Freud in his psychoanalysis. Since the philosophic blow against the dualism of body and soul, cultural history has not often experienced such a profound change. Freud—in his "depth psychology," his scientific explanations of the conscious and subconscious existence—peeled off one more layer covering our psychophysical kernel.

In his doctrine of psychoanalysis two main strata are of importance:

First, the overwhelming influence of the subconscious upon the conscious life, the "id" with its primordial drives. The subconscious is the great warehouse of repression, of basic emotions as well as acquired feelings, the latter mainly conditioned by society, by its social and moral contradictions, by its hypocrisy. The sexual hysterias of the Victorian era or the neuroses caused by the ruthless competitive system of capitalism are but two examples.

The second strata is the limitless creative potency of the subconscious existence, an emotional "vision in motion," a new territory, richly fertile if protected by effective therapies from erosion.

Freud's discovery of the creative nature of these subconscious forces would be justification enough for a new literary form. Their recording can begin the healing

process of damaging displacements, guilt complexes and repressions. The new literary language may lead one day to a regulation of the powerful instincts and the seeming irrationalities of the subconscious pattern and to a better knowledge of genuine unity of the conscious and subconscious existence.

James Joyce

Although the surrealists emphasized such a goal, the new form of communication was not accomplished by them, but more by the dadaists and simultaneously and even more by James Joyce. (This observation is not only valid in literature. It is significant that the revolutionary impulses, and aims crystallized during the first quarter of the XXth century have been diluted everywhere into an often inconsequential estheticism by the young generation.)

Joyce's "Ulysses" was an excellent example of the new literary construction analogous to the cubist collage where different elements, fragments of reality, were fused into a unity of new meanings. Joyce showed that the seemingly inconsistent, illogical elements of the subconscious can give a perfect account of man, the unknown, who is always the same whether the Ulysses of antiquity or today's Leopold Bloom.

"Ulysses" was considered for many years an incomprehensible book, even nonsensical. But viewing the book in the light of the later "Finnegans Wake," it appears as a straight continuation of the 19th century psychological novel. It has a clearly circumscribed content—the story of a day, June 16th, 1904. It has its characters, its direct and symbolic meanings, its place and setting. • The book has its own technique of rendering—at some places the technique of the stream of consciousness, of rendering a constant penetration of the subconscious forces along with those of the conscious thoughts drawn from the scientific discourses of Freud and the therapeutic application of psychoanalysis. In spite of its strange richness, "Ulysses" leads the reader with clear logic to a vivid, naturalistic description of the life of an anachronistic city, of the place, events and persons involved, though astonishing elements of the subconscious sometimes enter the field. The inundation of the characters with rude and exalted attributes may at first frighten the inexperienced reader. He may be temporarily misled because of the frightfulness of the subconscious landscape which had not yet been exploited in pre-Joycean literature. However, Joyce handles the subconscious man—a new "ecce homo" with lucid explicitness and one has to submit to the unusual and the shocking without fear as one submits to the knife of the surgeon if recovery is promised.

The peculiarity of Joyce's language is its multiple meaning, achieved through the fusion of the external reality with the subconscious state in the form of the interior monolog—"stream of consciousness"—and the day dreams of an introvert, centripetally condensed. In this way situations—old and new—words and sentences are

• *His characters, though living in Dublin, are basically the same as the Homeric figures. This conception can be seen as either debunking the hero or elevating the common man. This becomes, in Joyce's treatment, a framework of a wide range of insight.*

recast and shifted to unexpected connotations, cunning, intricate, pouring out humor and satire. Flashing sparks from the subconscious, mixed with trivialities of routine talk, sharp-tongued gossip illuminate hidden meanings. Puns are of deep significance, touching off liberating explosions. "Ulysses" comes as a breath of fresh air through its nimble, precise definitions of events and persons.

Quotation from
"Ulysses" •

Pages 41-42

".....And at the same instant perhaps a priest around the corner is elevating it. Dringdring! And two streets off another locking it into a pyx. Dringadring! And in a ladychapel another taking housel all to his own cheek. Dringdring! Down, up, forward, back, Dan Occam thought of that, invincible doctor. A misty English morning the imp hypostasis tickled his brain. Bringing his host down and kneeling he heard twine with his second bell the first bell in the transept (he is lifting his) and, rising, heard (now I am lifting) their two bells (he is kneeling) twang in diphthong.

Cousin Stephen, you will never be a saint. Isle of saints. You were awfully holy, weren't you? You prayed to the Blessed Virgin that you might not have a red nose. You prayed to the devil in Serpentine avenue that the fussy widow in front might lift her clothes still more from the wet street. O si, certo! Sell your soul for that, do, dyed rags pinned round a squaw. More tell me, more still! On the top of the Howth tram alone crying to the rain: naked women! What about that, eh?

What about what? What else were they invented for?

Reading two pages apiece of seven books every night, eh? I was young. You bowed to yourself in the mirror, stepping forward

to applause earnestly, striking face. Hurry for the God-damned idiot! Hray! No-one saw: tell no-one. Books you were going to write with letters for titles. Have you read his F? O yes, but I prefer Q. Yes but W is wonderful. O yes, W. Remember your epiphanies on green oval leaves, deeply deep, copies to be sent if you died to all the great libraries of the world, including Alexandria? Someone was to read them there after a few thousand years, a mahamanvantara. Pico della Mirandola like. Ay, very like a whale. When one reads these strange pages of one long gone one feels that one is at one with one who once . . .

The grainy sand had gone from under his feet. His boots trod again in a damp crackling mast, razorshells, squeaking pebbles, that on the unnumbered pebbles beats, wood sieved by the shipworm, lost Armada. Unwholesome sandflats waited to suck his treading soles, breathing upward sewage breath. He coasted them, walking warily. A porter-bottle stood up, stogged to its waist, in the cakey sand dough. A sentinel: isle of dreadful thirst. Broken hoops on the shore; at the land a maze of dark cunning nets; further away chalkscrawled backdoors and on the higher beach a dryingline with two crucified shirts. Ringsend: wigwams of brown steersmen and master mariners. Human shells."

Pages 729-30-31

".....they're all so different Boylan talking about the shape of my foot he noticed at once even before he was introduced when I was in the DBC with Poldy laughing and trying to listen I was waggling my foot we both ordered 2 teas and plain bread and butter I saw him looking with his two old maids of sisters when I stood up and asked the girl where it was what do I care with it dropping out of me and that black closed breeches he made me buy takes you half an hour let them down wetting all myself always with some brandnew jad every other week such a long one I did I forgot my suede gloves on the seat behind that I never got after some robber of a woman and he wanted me to put it in the Irish Times lost in the ladies lavatory DBC Dame street finder return to Mrs Marion Bloom and I saw his eyes on my feet going out through the turning door he was looking when

I looked back and I went there for tea 2 days after in the hope but he wasn't now how did that excite him because I was crossing them when we were in the other room first he meant the shoes that are too tight to walk in my hand is nice like that if I only had a ring with the stone for my month a nice aquemarine Ill stick him for one and a gold bracelet I dont like my foot so much still I made him spend once with my foot the night after Goodwins botchup of a concert so cold and windy it was well we had that rum in the house to mull and the fire wasnt black out when he asked to take off my stockings lying on the hearthrug in Lombard street well and another time it was my muddy boots hed like me to walk in all the horses dung I could find but of course hes not natural like the rest of the world that I what did he say I could give 9 points in 10 to Katty Lanner and beat her what does that mean I asked him I forget what he said because

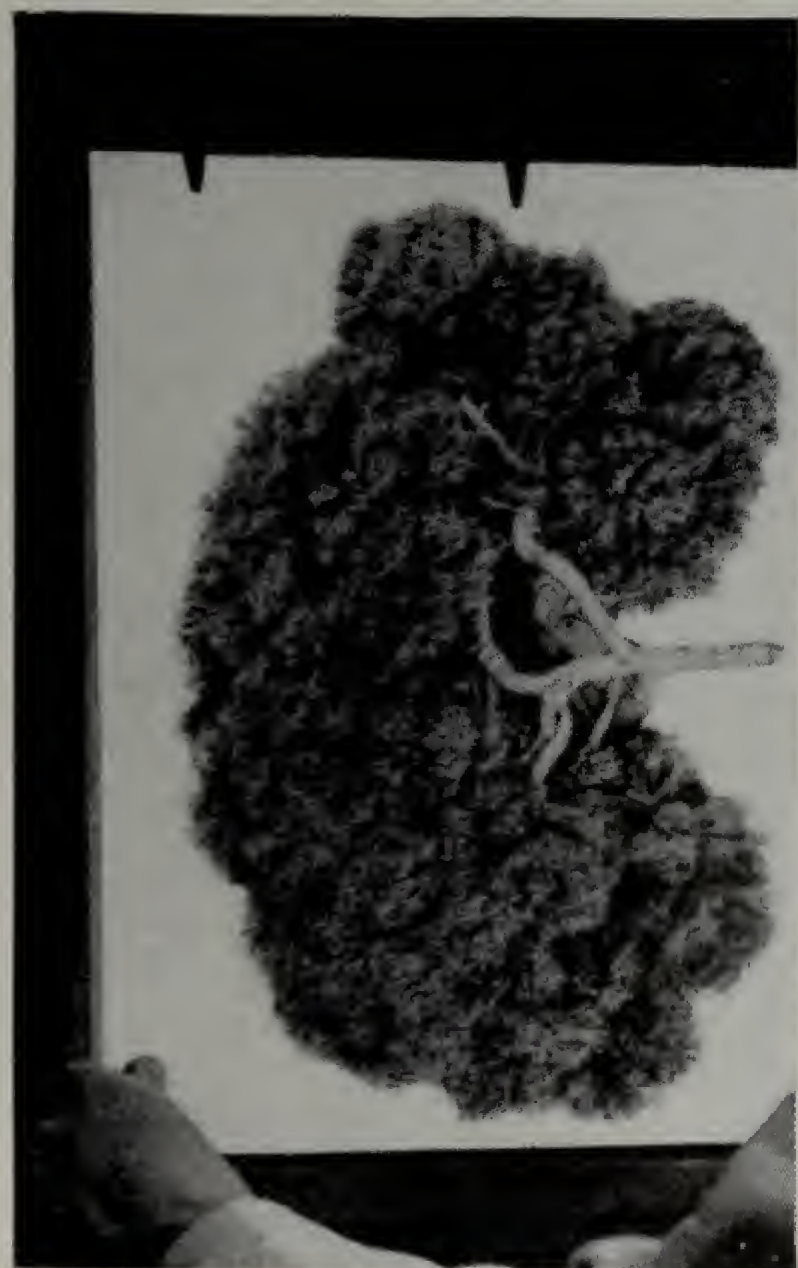
• Parts of it first published in the "Little Revue" of Margaret Anderson and Jane Heap, Chicago, 1918-20, later as a book in France by Sylvia Beach Shakespeare & Co. and in the U. S. A. by Random House.

the stroppress edition just passed and the man with the curly hair in the Lucan dairy thats so polite I think I saw his face before somewhere I noticed him when I was tasting the butter so I took my time Bartell dArcy too that he used to make fun of when he commenced kissing me on the choir stairs after I sang Gounods Ave Maria what are we waiting for O my heart kiss me straight on the brow and part which is my brown part he was pretty hot for all his tinny voice too my low notes he was always raving about if you can believe him I liked the way he used his mouth singing then he said wasnt it terrible to do that there in a place like that I dont see anything so terrible about it Ill tell him about that some day not now and surprise him ay and I'll take him there and show him the very place too we did it so now there you are like it or lump it he thinks nothing can happen without him knowing he hadnt an idea about my mother till we were engaged otherwise hed never have got me so cheap

as he did he was 10 times worse himself anyhow begging me to give him a tiny bit cut off my drawers that was the evening coming along Kenilworth square he kissed me in the eye of my glove and I had to take it off asking me questions is it permitted to inquire the shape of my bedroom so I let him keep it as if I forgot it to think of me when I saw him slip it into his pocket of course hes mad on the subject of drawers thats plain to be seen always skeezing at those brazenfaced things on the bicycles with their skirts blowing up to their navels even when Milly and I were out with him at the open air fete that one in the cream muslin standing right against the sun so he could see every atom she had on when he saw me from behind following in the rain I saw him before he saw me however standing at the corner of the Harolds cross road with a new raincoat on him with the muffler in the Zingari colours to show off his complexion and the brown hat looking slyboots as usual"

The cunning ambiguity of the Pythian oracle of Delphi was full of contradictory meaning depending upon where the listener put the commas, semicolons and periods. But the quoted passage from Marion Bloom's soliloquy is a stream of the subconscious stringing thoughts like beads without any punctuation to impede the widening and ascending spiral of meaning. But this did not yet make "Ulysses" a revolutionary work. Compared with the writing of the dadaists, who recreated the conscious and subconscious *in integration*, "Ulysses" is still "naturalism," even if of a two-dimensional kind. Joyce demonstrated in it the two levels of our psychophysical existence only in juxtaposition—though with marvelous precision. He telescoped nouns, verbs, adjectives into forceful images, visual and sound projections. He overthrew the old convention of a successive development of ideas. He took elements independent of space or time continuum when he needed them for the characterization of eternal human traits.

Fig. 432. Reproduction of a kidney in "latex", 1939



Whitman had already tried to show in his poems the finest structure of psychophysical details, as if they had been seen through a magnifying glass. The French naturalists, the Brothers Goncourt, Zola and later Proust, translated this technique into their prose. Joyce, too, was occupied with the precise formulations of an ultra-naturalism.

In "Ulysses" one has to perceive the whole with its interpenetration of details in order to grasp the dynamic fusion. The whole calls upon one's complete capacities, conscious and subconscious alike. The result is a richness and precision of rendition never before known.

In the new technology there are analogies for such a precision. It is not yet the super-precision of the microscopic section but—at least—that of the close-up. For example, with rubber liquid one can make visible the blood system of the kidney—a most complicated organ, full of minute details, never before seen in renderings of anatomic sections. Now, by injecting latex into the blood vessels and dissolving the tissues in acid after the rubber has set, an exact replica of the kidney can be produced with outside *and* inside visible. With this new technique, as with the new writing technique, *one sees more*.



Figs. 433 a, b. Pablo Picasso, 1924

Still life (in and out of focus)

While the uninitiated finds it difficult to read the picture in the original version, he easily can see—especially in color projection—the “normalcy” of the still life if it is out of focus. In this case it becomes very similar to the still lifes of Cézanne

Another analogy is a colored lantern slide of a cubist painting which is thrown out of focus when projected so that, for example, an unfocussed Picasso still-life of 1922 looks like a Cézanne. The peculiar green-red coloring of the Cézanne apples is repeated exactly in the Picasso apples out of focus. In focus, the same picture may appear to the inexperienced spectator as decomposed into incoherent shapes and color spots, entirely unfamiliar until the unfocussed view is shown which provides an almost macroscopic definition of the apples. The cubist painter, in trying to uncover the essential properties of his subject, worked with an infinitely greater precision than his predecessor. He tried to see more and what he saw he painted more intensely. With Joyce's language one can also see “more.”•

But what is this “more?”

It has been stated previously•• that the function of the complementary color in a painting—whether rendered actually, or produced only in the mind of the spectator—is to create a feeling of balance, the satiation of a psychophysical hunger. The way in which this is achieved determines the quality of painting. Joyce groped for a similar law on the large scale of man's total existence and tried to decode the impulses which seek to establish the psychophysical balance in every situation. Although man in his vanity and illusions is still pressed through heritage and education toward transcendentalism and tries to overcome his crises with metaphysics, Joyce found a rational method to balance such longings for “eternity” with the cyclic recurrence of biological and historical facts, personalities and characters.

Finnegans Wake

“Finnegans Wake” contains all these elements but in new relationships. The verbal richness of the “Ulysses” period is increased while the joined eye and ear sensation is retained. The previously naturalistic, descriptive effects are veiled, tending to obscurity, to manifold interpretations.

Joyce tried to avoid the limitation of a precise subject-rendering. The outpourings of the subconscious sphere did not allow an unalterable fixation. The pluralistic, timeless meanings could be better safeguarded if they remained flexible, not defined too sharply but enveloped in the amorphous quality of the dream.

“Glossas glossarum glossant” • • • may have been Joyce's desire. Ancient Roman law was so terse, yet so complete that later centuries did not seek new laws but merely interpretation of the original codes. Then these explanations of the glossarist were glossed again and again by new glossarists. This may explain the vaulting ambition

• A little child, painting a horse, showed the picture to his older sister who burst into laughter. “Why do you laugh?” asked the child indignantly, “do you not see that it is more horse than a horse?”

•• Pages 160-161.

••• “Interpretations of interpretations interpreted.”

of Joyce to create a new introspective bible, a universal repository of trends and traits of the human being which will provide material enough for commentators of generations to come.

While in "Ulysses" he postulated the unity of personalities, in "Finnegans Wake" he took up Vico's idea of the cyclically recurring history. In "Finnegans Wake," in a trancelike atmosphere of a day-dream, no value is placed upon details as such, only upon their discrete relatedness. The consecutive order of the outer reality is suspended so that the inner world with its greater "truth" can be demonstrated. There is no "up" and no "down," no "forward" and no "backward," no sequence of direction, position, time, space. Only the synthesized absolute relationship of events and personalities, like an equipoised sculpture, hovers in the universe. This does not mean that "Finnegans Wake" is entirely the outpouring of automatic writing, unchecked by the conscious mind. On the contrary: If one accepts the diffuse nature of the book and does not try to make comparisons with previous forms of literary expression, it becomes clear that the intellect, the logical mind, plays a dominant role in it. The book is controlled by a sharp intellect which filters every detail with great discrimination through the meshes of a Machiavelian alertness. One senses its fullness, the reverberations of the psyche as well as of history and culture even if it is impossible to follow all their implications without sharing Joyce's polyhistoric and multilingual knowledge. At the frontier between a passing and a new epoch his language is composed of all languages and all the contemporary slangs in order to make understandable the present, past and future travail of the world in its variegated yet eternal recurrence. Joyce is the vessel of very old knowledge and very new hunches. One feels behind his work a universal wisdom from which the conscious and the subconscious receive their impetus. This two-edged intelligence of Joyce creates the atmosphere in which the subconscious releases the poetic quality: the bleeding from a thousand wounds followed by a Homeric laughter. The subliminal conflicts between the conscious conception of writing as an ideological task and the subconscious tendency of release are in Joyce interlocked functions of human existence. In a state of balance the ideal may be to feel what one thinks and to think what one feels. Joyce is rather near to this state. With his language one almost hears and sees, thinks and feels at once not only the scope and the problems of the world, but of oneself as well. One of the tragedies of our generation has been the forced belief in "today," in "progress," the stability of humanistic ideals. Joyce was not deceived by such camouflage. He knew man's timeless faults as well as his virtues. He had no illusions about potential duplications of barbarism. He stood for a totality of existence, of sex and spirit, man and woman; for the universal against the specialized; for the union of intellect and emotion; for blending history with forecast, fairy tale with science. With this he liberated himself from the restrictions imposed upon writers by Marxian theorists whose demand for adherence to the tactics of the party often neglected basic emotional concepts and human traits. Their eyes were too often directed toward the ephemeral and the transient, thus short-circuiting the

constant and multifarious. Joyce contained multitudes.[•] And with these "multitudes", he paved the way to a related, space-time thinking on a larger scale than any writer had done before.

From
"Finnegans Wake"

(first published as "Work in Progress" in "transition", later in book form by The Viking Press, New York, 1939) ••

"Bygmester Finnegan, of the Stuttering Hand, freemen's mauerer, lived in the broadest way immarginable in his rushlit toojarback for messuages before Foshuan judges had given us numbers. . . .

". . . . erigenating from next to nothing and celescalating the himals and all, hierarchitectitiptitoploftical. . . .

"Arrah, sure, we all love little Anny Ruiny, or, we mean to say, love-little Anny Rayiny, when unda her brella, mid piddle med puddle she ninnygoes nannygoes nancing by.

"No nubo no! Neblas on you live! Her would be too moochy afreet. Of Burymeleg and Bindmerollingeyes and all the deed in the woe. Fe fo fom! She jist does hopes till byes will be byes. Here, and it goes on to appear now, she comes, a peacefugle, a parody's bird, a peri potmother, a pringlpik in the ilandiskippy, with peewee, and powwows in beggybaggy, on her bickybacky, and a flick flask fleckflinging its pixylighting pacts huemeramybows, picking here, pecking there, pussypussy, plunderpussy.

"How bootifall and how truetowife of her, when strengly forebidden, to steal our historic presents from the past postpropheticals so as to will make us all lordy heirs and ladymaidesses of a pretty nice kettle of fruit.

"As the lion in our teargarten remembers she nenuphars of his Nile of eyebrow pencilled, by lipstipple penned. Borrowing a word and begging the question and stealing tinder and slipping like soap. From dark Rasa Lane a sigh and a weep, from Lesbia Looshe the beam in her eye, from lone Coogan Barry his arrow of song, from Sean Kelly's anagrim a blush at

the name, from I am the Sullivan that trumpeting tramp, from Suffering Dufferin the Sit of her Style, from Kathleen May Vernon her Mabbe fair efforts, from Fillthepot Curran his scotch-love machreether, from hymn Op. 2 Phil Adolphos the weary O, the leery, O, from Samyouwill Leaver of Damyouwell Lover thatjolly old molly bit or that bored saunter by, from Timm Finn again's weak tribes, loss of strength to his sowheel, from the wedding on the greene, agirlies, the gretnass of joyboys, from Pat Mullon, Tom Mallon, Dan Meldon, Don Maldon a slickstick picnic made in Moate by Muldoons. The solid man saved by his sillied woman.

"There was a time when naif alphabetters would have written it down

". . . for the goods trooth bewilderblissed. . . .

"He misunderstood and aim for am ollo of number three of them. . . .

"But our undilligence has been plutherotested so enough of such porter black lowneess, to base for printink.

"Gossipaceous Anna Livia

"Melodiotiositis in pure fusion by the score

"Byfall.

"Upploud.

"Mawmaw, luk, your beeejstay's fizzin over.

"The fright of his light. . . .

"Enterruption

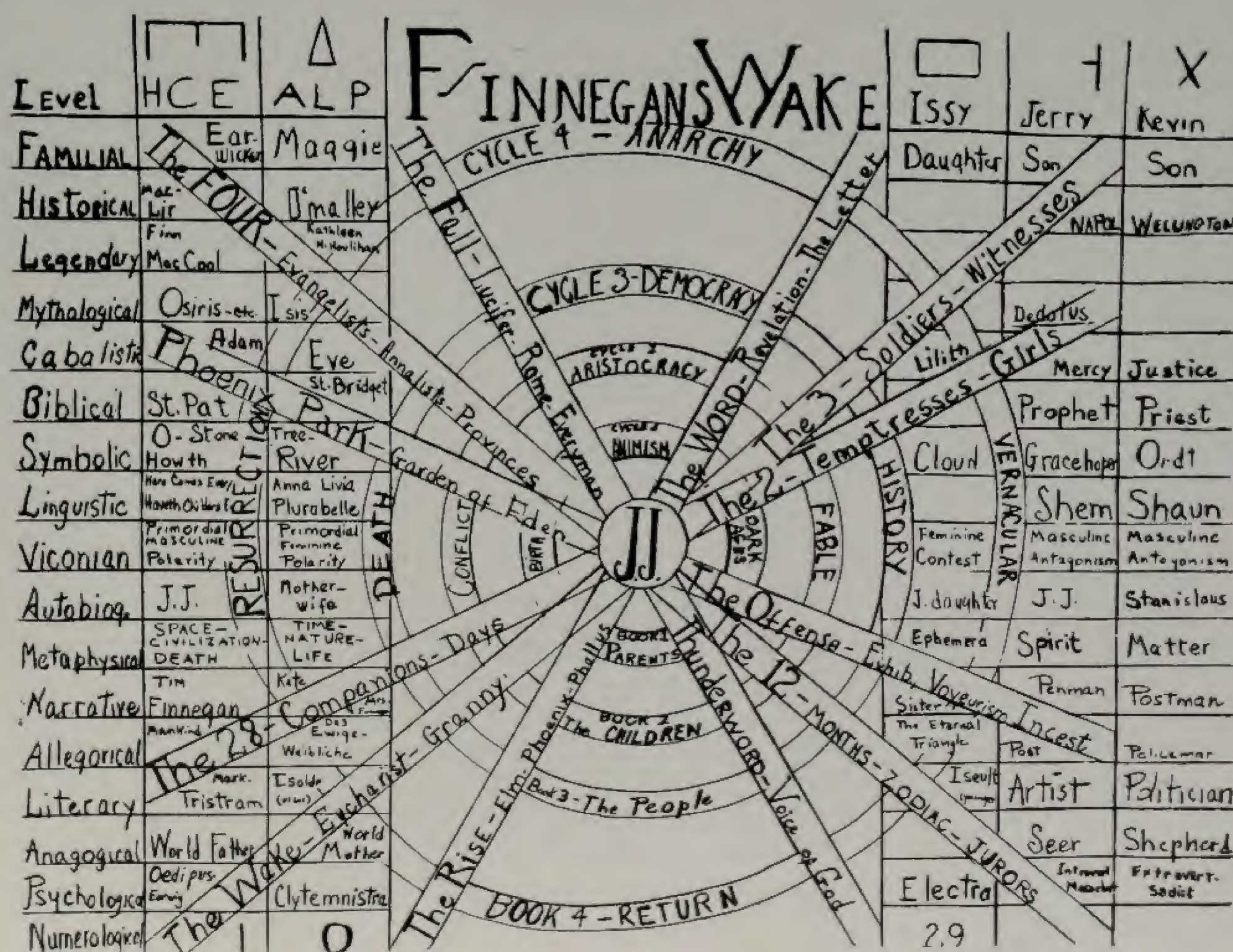
". . . beside that ancient Dame street, where the statue of Mrs. Dana O'Connell, prostituent behind the Trinity College, that arranges all the auctions of valuable colleges."

• Whitman said of himself "I contain multitudes," when challenged for inconsistency.

•• Many excellent essays have been written about Joyce. Suggested for reading are R. Miller-Budnitzkaya "James Joyce's Ulysses" (Dialectics V, 1938); Carola Giedion-Welcker "The Function of the Language in Contemporary Poetry" ("transition," No. 22, 1933); "James Joyce" by Harry Levin (New Directions, 1943); "A Skeleton Key to Finnegans Wake," by Joseph Campbell and Henry Morton Robinson (Harcourt, Brace and Co. N. Y. 1944) is an interesting though sketchy attempt to solve the enigma of Joyce's last work.

	Pages	Title	Time	Place	Principal Characters	Odyssean Counterpart	Hebraic Parallel	Art	Color	Physiological Symbol	External Symbol	Technique
1	5-24	Telemachus	8 am	Martello Tower	Stephen Dedalus Buck Mulligan	Telemachus Mercury		Theology	White Gold	-	Heir	Narrative (Young)
2	25-37	Nestor	10 am	Deasy School	Stephen Mr. Deasy	- Nestor		History	Brown	-	Horse	Catechism (Personal)
3	38-51	Proteus	11 am	Beach	Stephen	-		Philology	Green	-	Tide	Monolog (Male)
4	55-69	Calypso	8 am	Bloom House	Leopold Bloom Molly Bloom	Ulysses Penelope	Burnt Offering Holy of Holies	Economics	Orange	Kidney	Nymph	Narrative (Mature)
5	70-85	Lotus-eaters	10 am	P.O.-Church Chem.-Bath	Bloom Communicants Martha Clifford	- Lotus Eaters Calypso	Rite of John	Botany, Chemistry	Yellow	Genitals	Eucharist	Narcissism
6	68-114	Hades	11 am	Cemetery	Bloom Paddy Dignam	- Elpenor	Rite of Samuel	Religion	Black	Heart	Sexton	Incubism
7	115-148	Aeolus	12 n	Newspaper Office	Stephen Bloom Dan Dawson	- - Aeolus	Urim and Thummin	Rhetoric	Red	Lungs	Editor	Enthymonic
8	149-181	Lestrygonians	1 pm	Davy Byrne's	Bloom Blazes Boylan	- Antinous	Rite of Melchizedek	Architecture	Blue- Green	Esophagus	Constable	Peristaltic
9	182-215	Scylla & Charybdis	2 pm	Library	Stephen Aristotle Plato	- Scylla Charybdis	Holy Place	Literature	Silver	Brain	Snake- spear	Dialectic
10	216-251	Wandering Rocks	3 pm	Dublin Streets	Whole Cast	-	Simchath Torah	Mechanics		Blood	Citizen	Labyrinthine
11	252-286	Sirens	4 pm	Ormond Bar	Bloom Barmaids	- Sirens	Shira Shirim	Music	Bronte, Gold	Ear	Formid	Fuga per Canonem
12	287-339	Cyclops	5 pm	Barney Kiernan's	Bloom The Citizen	- Polyphamus	Holocaust	Politics	Green	Muscle	National- ist	Gigantism
13	340-376	Nausicaa	6 pm	Beach	Bloom Gerty MacDonald	- Nausicaa	Rite of Onan	Painting	Blue	Eye	Virgin	Tumescence, Detumescence
14	377-421	Oxen of the Sun	10 pm	Maternity Hospital	Bloom Stephen Medical Students	- - Companions	Heave Offering	Medicine	White	Womb	Maternity	Embryology
15	422-593	Circe	Mid- night	Brothel	Bloom Stephen Bella Cohen	- - Circe	Armageddon	Magic	Brown, Yellow	Legs	Harlot	Hallucination
16	597-649	Eumaeus	1 am	Lunchroom	Bloom Stephen Skin-the-goat	- - Eumaeus	Atonement	Navigation	Grey	Nerves	Sailor	Narrative (Old)
17	650-722	Ithaca	2 am	Bloom House	Bloom Stephen	- -		Science	Brown	Skeleton	Star	Catechism (Impersonal)
18	723-768	Penelope	3 am	Bloom's Bed	Molly Bloom	-		Anativeness	Red	Flesh	Earth	Monolog (Female)

In its efforts to integrate the arts, the Institute of Design brings before the students the great creative writers in lecture series. For a better understanding of the work of James Joyce, Leslie L. Lewis prepared charts disclosing the structure of the books "Ulysses" and "Finnegan's Wake"



Though such random quotations from "Finnegans Wake" can but hint at the intricate use of language but not the structure of the book, they indicate Joyce's capacity to evoke a rich atmosphere, and his method of producing new and fuller meanings by recombination, twisting and distortion of words. This is very similar to the technique of the cubist painter who superimposed and interpenetrated elevation, groundplan and cross-section into a space-time coherence and employed distortion to emphasize substance and a vision in motion.

"The method is quite simple! You distort the words in a given passage so that they suggest at one and the same time not only the original normal ones but also another series of verbalism which they now resemble. In order to convey these multiple phrases at once, it is important to respect the intonation of the whole as well as the individual words whose units of sound are being distorted. The procedure is therefore more complicated than a series of puns or individual words. Moreover, the words heard in overtone must be systematically related and must contribute to a single planned effect."[•]

In analyzing these "puns" of multiple meaning, one may come *near* to the author's possible interpretation. But it is the reader's knowledge and education which is the measure of the exact or hit-or-miss explanation. Here are a few samples:

"There's the Bell for Sexaloiter."

The multitude of possible meanings are at first almost bewildering, but attempts at a solution are soon transformed into an intellectual game, which slowly becomes a part of the subconscious ability to grasp such sentences and composite words without conscious analysis.

The bell is ringing ("laeuten" in German) for the six o'clock mass; but also Belle, the girl, is there to loiter for a "Sechser" (a "dime" in Germany). Or: Belle is there for sexual loitering; or sex exploitation? Also, every third Monday in April, Zürichers celebrate the "Sechseläuten," a Beltane feast, by burning the "Bögg," the demon of winter.

Another one:

"Oh, my back, my back, I want to go to Aches-les-Pains."

Aix-les-Bains is the well-known French spa for rheumatism, gout, etc. But here the name changes into the designation of the cause: "aches and pains." This has a similarity to the handling of the Guernica sketch by Picasso (page 250) where the face of the terror stricken woman also contains the piggish visage of Hitler, who caused her sufferings.

"Tree taken for grafted"

indicates "taken for granted;" but here is "grafted" which may be taken as implied in the process of "grafting a tree," but also as political "graft."

[•] "The Language of James Joyce" by Margaret Schlauch, in "Science and Society," Vol. III, No. 4, 1939.

With his expressive, lucid interpretation of a foreign language Joyce amazes even those whose mother tongue he uses.

" . . . takes a szumbath for his weekend and wassarnap for his refreshment. . ."

This sentence plays with Hungarian words which he enlarges with new connotations. He accomplishes this by juggling three languages, Hungarian, English and German. Through his conjuring trick the words logically follow each other in their new implications much as they did in their original meaning.

"Szombat" is Saturday, "vasarnap" is Sunday. "Nap" has a double meaning "day" and "sun."

Joyce makes "sunbath" (szumbath) out of "szombat" (Saturday), indicating that one usually takes a sunbath at the weekend. Sunday (vasarnap) follows Saturday (szombat) just as after a sunbath one takes a dip as a "frisky" refreshment. "Wassarnap" can be understood as a "nap in the water" if the similarity with the German "Wasser" (water) is recognized.

But "nap" is in Hungarian also "sun" so that at the end Joyce produces a most elegant pun, a crosswise identity:

$$\begin{array}{ccccccc} \overbrace{s & u & n} & b & a & t & h \\ \underline{w} & \underline{a} & \underline{t} & \underline{e} & \underline{r} & \overbrace{n & a} & p \end{array}$$

Of course, the danger of this type of explanation is the destruction of the fresh impact of the surprise which one experiences at the first reading in context; the fluidity of "felt" movement has a "plastic" impact not consciously explicable.

It is a doubtful commonplace that "puns are the lowest form of humor." In the case of "Finnegans Wake" this statement surely does not fit. Joyce's wit is very candid. He quickly builds up a mood of ease. The reader is willing to go on with the rather complex task involved in reading the book. The gaiety, implicit between the lines, between the words, and *within* the composite words, makes one feel happy. At the same time there is a feeling that the author himself enjoys most of all the grand spectacle of life in spite of his murderous knifing of human petulance. When he scourges social and individual deficiencies, he does not sound as if he were preaching in gloomy rage. His humor grows beyond the obvious in the word combinations with their ambivalent or multiple meanings. He speaks for example about the "panaroma of all flores of speeches." There is something to see: "panorama;" but also something to smell: "flores" (flowers); and to taste: "aroma," and things to touch and feel—peaches, speeches and species.

Has he achieved here the coordination and the interchange of the senses which Rimbaud meant? Is his an x-ray technique of verbalization? Probably. It is the approach to the practical task of building up a completeness from interlocked units by an ingenious transparency of relationships. The method parallels the cutting of motion pictures. The editor of a film sometimes relates (pastes) units—different shots—made at different places and different times, into a new entity. The result may have little to do in its new synthetic existence with the original meaning of the single shots. Specifically, the Russian “machinegun” montage of the silent days, with the lightning-quick perception of relationships in the associative link of odd elements, shows a similarity to the Joycean kinetic technique of multiple compressions.

If one presupposes that there is an underlying unity of all creative work in a period, one can find in Joyce’s writings analogies to contemporary technological terms. In these terms Joyce’s manifolded word agglutinations (often constructed from German, Hungarian or other composites which sound normal in these languages but strange in English) appear to be similar to the industrial process of assemblage by bolts, rivets and screws:

“outtohelloutof that”

“wavyavyeavyheavyeavyeveyevy hair”

“bronzelidded”

“softcreakfooted”

“whitetallhatted”.

Joyce’s *fusion* of words, like

“panaroma”

“immarginable”

“eriginating”

“celescalating”

“bootifall”.

are again equivalent to the present technology of mass production as it occurs in welding, casting, molding, stamping.

Such approximations in motion pictures are as yet rare except in some surrealist and abstract films. •

“Finnegans Wake” is not as easy to comprehend as “Ulysses,” but as one becomes accustomed to its peculiar language the work as a whole loses much of its cryptic character. Without trying to size up his philosophic significance, Joyce’s universality and inventive capacity must be acknowledged with admiration.

●

In spite of animosity and misunderstandings, Joyce’s influence grows constantly.

• *Note how the language of contemporary advertising has adopted Joyce’s method of combination: “girlesque” instead of burlesque; “brunch” for breakfast and lunch; Pittsburgh “smog” meaning smoke and fog.*

For instance, one of the most original of the young American writers, Thomas Wolfe, showed brilliant use of the *word* which might very well have had Joyce for its godfather.

From "You Can't Go Home Again" by Thomas Wolfe (Harper Brothers, N. Y. 1940) :

"The Fox asleep was a breathing portrait of guileless innocence. He slept on his right side, legs doubled up a little, hands folded together underneath the ear, his hat beside him on the pillow. Seen so, the sleeping figure of the Fox was touching—for all his five and forty years, it was so plainly boylike. By no long stretch of fancy the old hat beside him on the pillow might have been a childish toy brought to bed with him the night before—and this, in fact, it was!

It was as if, in sleep, no other part of Fox was left except the boy. Sleep seemed to have resumed into itself this kernel of his life, to have excluded all transitions, to have brought the man back to his acorn, keeping thus inviolate that which the man,

indeed, had never lost, but which had passed through change and time and all the accretions of experience—and now had been restored, unwoven back into the single oneness of itself.

And yet it was a guileful Fox, withal. Oh, guileful Fox, how innocent in guilefulness and in innocence how full of guile! How straight in cunning and how cunning-straight, in all directions how strange-devious, in all strange-deviousness how direct! Too straight for crookedness, and for envy too serene, too fair for blind intolerance, too just and seeing and too strong for hate, too honest for base dealing, too high for low suspiciousness, too innocent for all the scheming tricks of swarming villainy—yet never had been taken in a horse trade yet!"

Wolfe's sentences are more than shimmering, sparkling variation or permutations of the words. Reading them quickly one becomes aware not alone of the brilliance of Fox' characterization, but beyond that, of the "plus" which turns writing into literature.

●

In 1935 Raoul Hausmann, the dadaist writer, gave a recital of excerpts from his novel. It was a text overloaded with details, precisely described; lengthy revelations; a baroque richness in every sentence. For a while the excessive details appeared to be somewhat out of date, if compared to the telegraphic brevity one is used to today. But slowly I was captured by the novel. The acoustical emphasis, the foaming waterfall of words, anticipated a literature of phonograph records and of the radio—not yet accepted but in the making. The ears are slower, less exact than the eyes. They have to be overloaded with a great variety as well as quantity of sensations before they can compete—as to reception—with the lightning quickness of the eyes.

●

E. E. Cumming's poem shows the influx of "brutal" slang into the elysian fields of poetry. The phonetic spelling makes the poem appear to be almost a puzzle:

"Y gudah	y doan o nudn
ydoan	Lisn bud LISN
yannuhstan	dem
ydoan o	gud
yunnuhstan an dem	am
y gudah ged	lidl yelluh bas
yunnuhstan dem doidee	tuds weer goin
y gaduh ged riduh	due SIVILEYE zum"

(from "View" No. 2 Series III) •

freedom and unpredictability

The new artist is deeply concerned with moral obligations toward the entire society of which he feels himself a part. In this sense Lessing's statement that "the theater is a moral institution" can be applied to all creative activities irrespective of their initial stimuli and peculiar media. Thus any art work is the result of the forces manifest in the social and economic structure and mirrored by man. Art may often appear bare of ideological clarity in the sense of a social program. However the artist is not a propagandist but more than any other person, a seismograph of his time and its direction, who consciously or unconsciously expresses its substance. Apart from this limitation of predetermined social and ethical existence, the creative artist is free as to his formulation. This freedom is the genesis of the unpredictability of genius.

• In "View," edited by Charles Henri Ford, a group of young writers tries to continue the American literary tradition of the avant-garde.

It is a strange paradox that the 20th century with world communication and interdependence of trade and politics also fosters a barren isolation of the individual through mechanization and city life. Although the inhabitant of the large city is dependent on many services, he has more opportunity for privacy than his ancestors had in any other previous period. City technology, manufacturing and service industries provide the family with delivery of goods, prepared food, hot water, heat, laundry, newspaper, book, radio performance and television. But when the bills are paid everyone considers himself free from personal obligations. Taking these amenities for granted the individual is in danger of becoming isolated, losing the realization of the collective nature of man's existence.

"Magna civitas, magna solitudo"—Great cities, great solitude (Latin proverb)

A small avant-garde is attempting a reorientation by overcoming or sublimating this isolation. There are artists, scientists and educators who seek to make their findings an integral part of the community, a new life for all, to transmute learning into a process of organic growth. But their fresh outlook has to be brought to the masses in order to increase the understanding of the political and economic forces and to prepare a full grasp of the sociobiological needs within the new technology. One of the great shortcomings of our civilization is the tendency to dispense knowledge without taking the responsibility for its interpretation. But responsible citizenship can come only by conversion of knowledge into personal growth and creative action. This would guarantee that everyone—whatever his profession—could act successfully within his field and contribute to others as well.

The fight for a new social and economic order is a constant process, but it is not the task of schools to make a decision as to the theories which should be victorious. The duty of the educator is to uncover the forces which form society so that the individual, equipped with the knowledge of the processes, may form his own opinion and make a decision about his position in this world.

Within the social sciences the analysis and practice of politics—as the tool of realization—could be a most important subject. But there is hardly a possibility that it will be accepted in the near future. No regime tolerates instruction producing criticism of its own methods even if constructively undertaken. Yet no education can be justified as an education for skills alone. It must include a qualitative analysis of social relationships. The results then must be translated into humanistic and ethical terms, independent of party tactics. A good method for this is to stimulate group activities such as student councils, group research, group poetry, which lead from a vicarious, passive attitude toward a well-directed, energetic participation.

group poetry as “word-modulator”

After having made students acquainted with the problems of literature, namely, with the professional problem of developing language as a flexible instrument for expression or as the emotional seismograph of a period, the task arises to deepen this understanding. The answer is active participation in the same way as the students of the Institute of Design not only become theoretically familiarized with the plastic arts, but learn to express themselves actively in the different media.

One of the principal findings is that—besides elementary working problems—studies may be made with results similar to the solutions of contemporary artists. In stimulating the student to tackle such problems, one may reach numerous objectives:

(1) The student, belonging to the younger generation sensitized to new aspects of life, will tend to grasp the contemporary trends with ease and will evolve a more positive attitude toward them.

(2) The student will go on to independently solve his problems which have little to do with the classic-historical routine. (However, history of literature will not be eliminated since most of the new problems grow at least partially, from past performances.)

(3) If confronted with the work of a new author, the student will not be frightened because he will recognize part of his own problem in it.

(4) He may learn to see the difference in quality between his and the artist's solution which is the start for improvement of his own accomplishments.

Group poetry is an excellent departure to eliminate inferiority complexes, fear of beginning. Its advantage is that it greatly helps to overcome isolation of the individual and prepares him for common tasks with his fellowmen.

“Poetry has to be made by all, not by one alone,” Lautréamont said. Group poetry awakens the imagination, widens the organizing power of the participants.

The technique of group poetry—as it is used in the Institute of Design—is simple. It follows the simultaneity procedure of Apollinaire. This gives a rather naturalistic start within the framework of inventive visual and acoustic combinations. At the beginning everyone in the group (the number may vary from ten to fifty) writes down a sentence on a common theme such as “War,” “Cinema,” “The Professions,” “Postwar problems,” “Significant Experiences,” and uses these sentences as the raw material for the group poem. The individual may take the part of, for example, a cabinet maker, lawyer, doctor, mechanic, artist, blacksmith, soldier, etc. Then a sentence is produced by each which covers the supposed activities of his “profession.” After the sentences are formulated, groups of five to ten persons are formed and a chairman appointed. Each group then writes a collective poem from the unrelated sentences which, during the group work, usually receive a surprising coherence. Afterward, the poems are performed by the groups and recorded on the phonograph. As the students’ acting and performance must reach the same level of creativeness as the poems themselves, this task becomes another channel of self-expression. The students’ interest will focus not only on the written version, but also on its auditory integration.

After this phase of the work, the students may go ahead with any number of solutions bringing their work into closer relationship with the dadaists, surrealists, etc. The new poetic quality and its fusion with our complex existence can be expressed more vitally through such an approach.

In the following example of group poetry the unrelated sentences, “the given data,” are underlined.

Sentences about professions

Cabinet maker	<u>put his plane against the panel and pushed</u>	Artist	<u>That what is obvious is seen, portrayed and misunderstood</u>
Lawyer	<u>Defend the accused</u> <u>Argue in the interest of client</u>	Blacksmith	<u>Twists hot iron shoes horses makes clamps</u> <u>door latches grills and bars</u>
Doctor	<u>I attempt to cure the ills of men</u>	Sergeant	<u>He bellowed “orders is orders”</u>
Plumber	<u>Bang—Bang—pop—sssss</u> <u>lift the lid connect the pipe</u>		
Gunner	<u>Zzoomm, bang, we shot the mark again</u>		
Mechanic	<u>A garage mechanic wiping stretching while</u> <u>wiping the windshield of a car driven by a</u> <u>round red man smelling of cigars</u>		

July, 1941
Summer Session, Somonauk, Illinois

The collective poem

an antiaircraft gunman makes Z Z Z O O O M B A N G
we S H O T the mark again

i attempt to cure the ILLS of men—(one voice)

i	}	(all)
put		
my		
plane		
against		
the		
panel		
and		

PUSH H H H - ED

defend the (all)

AKKUZZED (girls)

A R G U E

in the interest of the client he

B E L L O W E D

O R D E R S

I S

O R D E R S

A garage mechanic WIPING S T R E T C H I N G while he
W I P E D windshield rrrrrrrround rrred man smellllllll cegars

B A N G B A N G P O P

S S S S S S S S S S s s s s ssssss

lift the lid connect the pipe (fast all) ttwwissssstsss H O T

I RRR O N SHOES horses, clamps, doooooorr, l a t c h e s ,
GRILLSSS

B A R S

that which is obvious is seen portrayed and

misunderstood

(Lillian Garrett, Erma Lennox, Jesse Reichel, Joe Turner.)

Here is another exercise based upon a different set of unrelated sentences:

Group #2 poem

ology oh oh oh oh

oh the poor people

masses

maggots

a herd of locomotives lynching

ink in Kelly

a herd of saw of seagulls

ink at pelly

ink at pelly and pink

toleda toledus on toast borders destruction

destruction

destruction

solo supreme sox

clocks?

seconds

weeks months days years

centuries

centuryology

dutchology

in fact

dutchy dutchyology

February 1944

(David Aaron, Richard Filipovski, Pat Parker, Helen Quisenberry, Nick Savage, Beatrice Takeuchi)

individual work

Several young students became much stimulated by the group poetry work and continued to write. The most talented among them was Jack Snyder, a 19 year-old boy,

who was killed in action in the second world war in November 1944. I mourn the loss of this promising young man. Though he had not had the time to produce mature work, fragments show the gift that was there:

She

She's an endless cavern that re-echoes your call of eternity.

She's a trip through time.

She's the screaming delight of wind blown spray from breaking waves.

She's a bird's warble frozen on a winter day.

She's the snap of footsteps on cobblestone.

She's the thick fullness of spilled ink without the emptiness of its bottle.

IV

a proposal

youth only?

"He who has the youth has the future." Preparations are made in all quarters to "have" the youth, often casting the adult generation aside. However, for a better world yielding more from its resources for the struggling millions, one should also make a blueprint for a comprehensive adult education. I would almost like to say "compulsory" adult education, or better, a cooperative *activity plan* or *active recreation*. This last is the more important since present technology (let alone the advances in the making) may cut down working hours and the new sciences may increase life expectancy. It would be a major tragedy to be unprepared for a creative, that is, active use of the coming leisure time.

Since pioneering days America has had its cooperative activities, such as the townhall meetings in New England, work sharing at crop time, barn raising and other parties, utopian colonies, community centers, freemasons, conventions of associations, labor unions, women's clubs, Y.M.C.A., Y.W.C.A., religious sects—an infinite number of opportunities to meet and discuss diverse matters. These are generally good pagentry and pastime but not always a humble apprenticeship toward a creative, erudite life.

Group activity of the future must be more consciously aware of the mechanics of its own operation as well as of its results. Though the ancient civic centers, the Greek agora and Roman forum, were rather good instruments for creating public opinion

and group consciousness of communal issues, it is doubtful that the same type of civic instrument could be used for the same purpose in our time. It is most probable that we have to go through a period of trial and error—as in many other matters since the industrial revolution—before we can find the right framework for our own civic and “community centers.” Some elements of a healthy approach existed in the now suspended Federal Art Project, in some art centers and settlement houses of this country, partly in the Swiss La Sarraz Group of Madame du Mandrot, partly in the English health center of Drs. Williamson and Pearse (Peckham). Also the village colleges initiated by Henry Morris (Cambridgeshire), which provided workshops, laboratories, play and health supervision for the urban and agricultural population of large areas, stimulated the participants not to “reception” but to creative expression.

The new activity “plan” must be more dimensional; an activity in relationships. It must bring about a complete integration of the technological and sociobiological values dormant in the industrial age. Instead of social climbing, charity or misplaced personal sacrifice, it should lead to a happy participation. Instead of the cocoon type of isolation, it should generate a mutual exchange. It should break down general prejudices by eliminating unchecked misprints of the mind, reverberations of superstitions and gossip. It should bring an abundant life as well as intellectual perseverance.

The new activity plan must be understood as part of activized social living in the most varied and productive forms of culture and health. Instead of a passive flood over the eyes and ears by radio, television, cinema and press, it must lead to an active participation in workshops and plays, symposiums and political discussions. This would create the stimuli for a rejuvenation of creative citizenship, spontaneity and an understanding of the needs of the community. But all this must have a preparation. There must be a natural demand for the forms of realization. Such a demand can be created best when integrated education—as outlined in this book—will be not an exception but the general rule.

parliament of social design

Every civilization has to build up step by step its necessary working instruments. Young America achieved this mainly through the generosity of wealthy donors who erected scientific institutes, universities and colleges, museums, art institutes and foundations—giving special contributions for various research projects. Most of these institutions are working on specialized tasks according to the haphazard interest of the patrons. However, what neither America nor any other continent has built up yet are thriving agencies which strive for coordination of activities, for a synthesis. Such agencies should be cultural working centers, institutes of workers who by mastering their own fields, could embody all specialized knowledge into an integrated system through cooperative action.

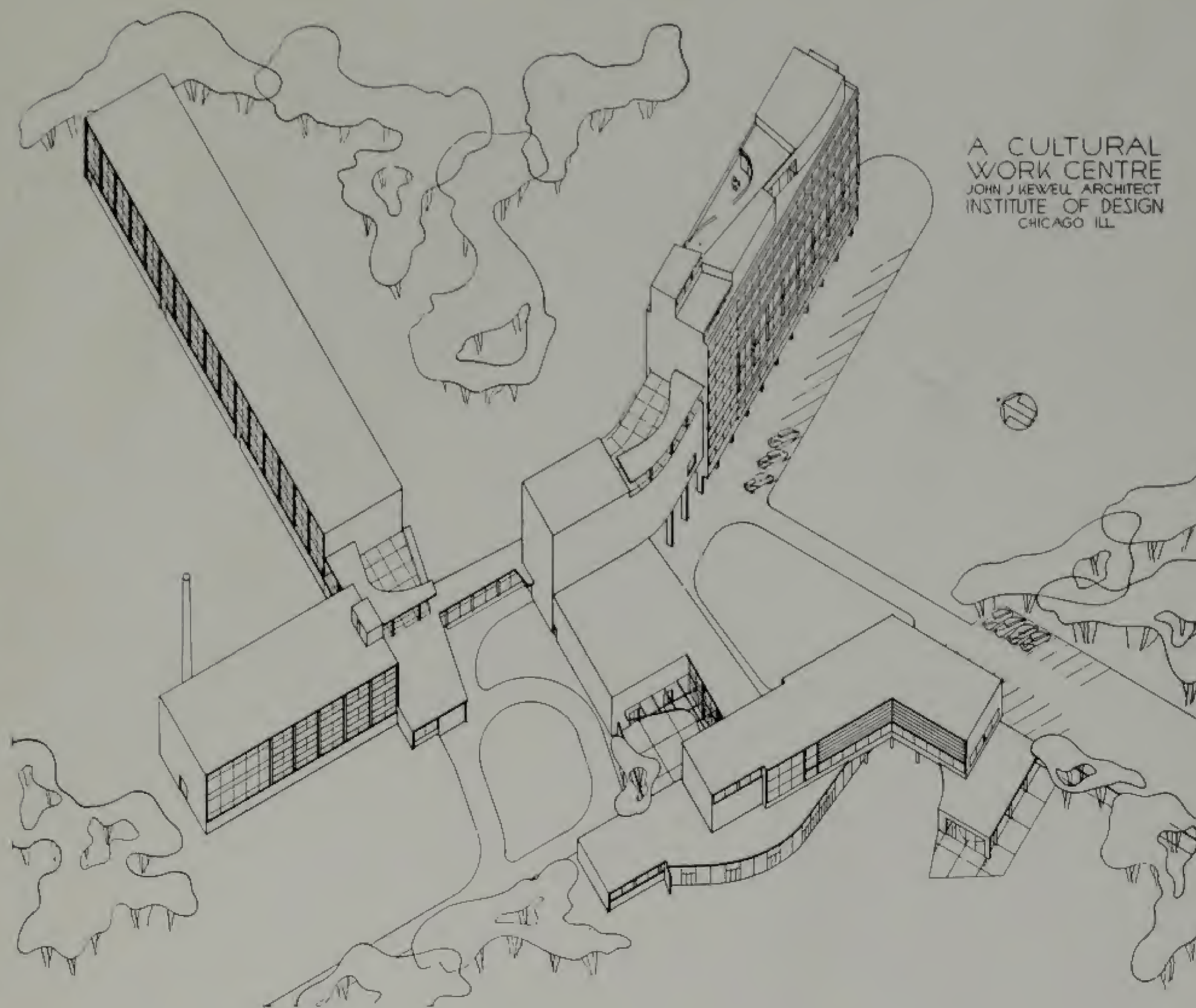
Such experts are already working in different parts of the world. If earnest efforts were made to relate their findings and if a suitable environment could be found

Figs. 436-439. O John J. Kewell, 1943

A cultural working center

In our civilization of specialists whose work is rarely coordinated it would be a blessing to assemble scientists, artists, technicians and businessmen under one roof. There they would have all facilities to work on their specific problems in workshops, studios, and laboratories. But they would be required to hold weekly councils in order to approach and solve one particular problem of social importance through a common effort.

The plan envisions a complex building with modern working conditions for research and with all the amenities of the physical equipment



general and higher education; industry and agriculture; village colleges; sociography of towns, cities, countries, continents; the social phenomena of working processes; folklore; crime and rehabilitation, economics and government, etc.

The assembly could then continuously publish its findings in reviews and books, motion pictures and broadcasts.

It could plan exhibitions, plays, symposiums and congresses; propose, demonstrate and indicate settlement of issues of fundamental importance.

Together with its possible branches the assembly could represent a center of the highest aspirations. As the nucleus of a world-government it could prepare new, collective forms of cultural and social life for a coming generation.

In accepting the responsibility of initiative and stimulus, it could serve as the intellectual trustee of a new age in finding a *new unity of purpose*; not a life of metaphysical haze but one based upon the biological justice to develop all creative capacities for individual and social fulfillment. It could write a new charter of human life, culminating in the right to *and the capacity of* self expression (the best bond for social coherence) without censorship or economic pressure.

It could translate Utopia into action.

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